



FRIDAY, NOV. 28.

CONTENTS.

ILLUSTRATIONS:	PAGE.	EDITORIAL NOTES.....	PAGE.
Harris Sleeping and Drawing Room Car (with inset).....	816	NEW PUBLICATIONS.....	816
Wear of Rails in Tunnels.....	818	TRADE CATALOGUES.....	826
Standard Trestle—Pennsylvania R. R.....	820	GENERAL NEWS:	
A New Endless Belt Planer.....	820	Locomotive Building.....	829
The Merriman Bolt Cutter.....	821	Car Building.....	829
A Novel Form of Flexible Tubing.....	823	Bridge Building.....	829
A Track Detail.....	828	Meetings and Announcements.....	829
CONTRIBUTIONS:		Personal.....	830
Repairs to Locomotive Fire Boxes.....	815	Elections and Appointments.....	830
Alleged Failures of Steel Axles in India.....	815	Railroad Construction.....	831
Plate Floors on the New York, Providence & Boston R. R.....	815	General Railroad News.....	832
The Secretaryship of the Am. Soc. C. E.....	815	Traffic.....	832
Position of Dwarf Signals.....	815	MISCELLANEOUS:	
EDITORIALS:		Technical.....	828
Passenger Rates and Passenger Receipts.....	824	Railroad Law.....	829
Making Rules Plain.....	825	The Scrap Heap.....	828
Construction of Fire Boxes with a View to Repairs.....	825	The Time Convention and the Coupler.....	819
October Accidents.....	825	Circular of the Plant System Explaining Rules 96-99 of the Standard Code.....	819
Annual Reports.....	826	Train Accidents in the United States in October.....	821
		Notes by the Way.....	823
		Hydraulic Machinery at St. Lazare Station, Paris.....	823
		Foreign Notes.....	826
		A Course of Instruction in Railroad Management.....	827

Contributions.

Repairs to Locomotive Fire Boxes.

CHINA, Aug. 30, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have repeatedly examined the ordinary types of American locomotive boilers with a view of arriving at the best method for renewing tube plates somewhat as is customary in Europe, viz., without unbolting the outer fire box or interfering with side plates.

In most cases the boxes are certainly so designed that the outer casing must be partially removed, in which case how are the joints made so as to permit of recalking two or more times during the life of boiler? If the lap is enough to permit of edges of plate being chipped fair, obviously a tight joint must be difficult to obtain.

The subject is a most interesting one to many of your readers, and if you could publish an account of the methods adopted I feel sure it will be heartily appreciated.

The fire hole flanging makes an excellent job, but the renewal of rivets would be difficult, and it besides requires the riveting to be done before stays are inserted—see fig. 1. In England the type fig. 2 has been adopted for steel fire boxes and has the advantage of the rivets and joint being completely exposed for repairs should they become necessary.

With regard to the French experiments on long and short tubes, is it better to add a foot to your fire box or a foot to your tubes, the total length of boiler being the same and increase of grate area of no importance?

FIRE BOX.

[Comment on this letter will be found in the editorial columns.—EDITOR RAILROAD GAZETTE.]

Alleged Failures of Steel Axles in India.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I note in an English paper a statement of the failures of steel axles on Indian railroads, and it is so unfair to that material when properly worked into axles that I feel that the report should not be allowed to pass without remonstrance from our railroad men. Ignorance and prejudice alone can account for the results stated as obtained on the Indian railroads.

We are using steel for boilers, rods, piston rods, crank pins (passenger axles to some extent), truck channels, tank angles, tires, rails, Fowler wheels, crossheads, etc., etc. I regard steel as simply a pure homogeneous "carbon iron" whose quality it is possible to change to suit conditions of use. We have some broken iron car journals I should like you to see to illustrate the superiority of good steel. I have always been a strong advocate of steel, and when it fails I find it has not been of proper quality or properly treated. The only place I have abandoned it is for case-hardened pins for link motion.

U. S.

Plate Floors on the New York, Providence & Boston.

Office of Chief Engineer,
New York, Providence & Boston Railroad Co.
PROVIDENCE, R. I., Nov. 18, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

We have at present actually in use two bridges with solid plate floors and gravel ballast supporting our

double tracks, and two highway bridges with solid plate floors, and ordinary concrete on top of the same. We have three bridges of considerable span supporting our double tracks with our ordinary standard timber floor, but so far as loading is concerned, calculated for solid plate floors and ballast track, our intention being to put on such floors when the timber floor requires renewing.

We have under contract, and expect the erection to commence within a very few days, two city highway bridges, provided with plate floors and concrete or road metal roadway. We also have two double track railroad bridges under contract, and to be delivered soon, which are designed for ballast floor loading.

You may infer from the above that, so far as maintenance or inspection of such structures is concerned, our actual experience has not been extensive, but as our bridges are designed we find little difficulty in inspection. As to maintenance, I do not think there could be any question as to the superiority of the solid plate floors, if you could afford the first outlay. You may consider us a little conservative in regard to this matter and not inclined to go too fast in this direction.

In the important terminal work in Providence there are many special advantages in the solid plate floors, and I may say that all parties concerned consider that construction adapted to this work.

I believe solid ballast floors to be the right thing for short span bridges and city work, where railroad tracks cross under or over streets (especially over), on account of two great special advantages, namely, deadening noise and reducing thickness of floor.

E. P. DAWLEY,
Chief Engineer.

The Secretaryship of the Am. Soc. C. E.

TO THE EDITOR OF THE RAILROAD GAZETTE:

It seems to me that Messrs. Blair & Rudd's letter in your issue of the 21st removes the only formidable feature in the objections I have heard made to the nomination for Secretary of a non-resident Associate, viz.: Mr. Leverich's argument that a non-voting Associate could not serve on the Board of Direction. This I thought the only point where the meaning of the Constitution could reasonably be held to be against such nomination.

But I cannot agree with Messrs. Blair & Rudd in saying: "If Mr. Leverich's point had been that Mr. Trautwine's nomination violates the letter of the Constitution, it could not be disputed, because Section 4 of Article VII., which he cites, declares in so many words that the candidate for Secretary nominated by the Nominating Committee shall be a resident Member."

The section in question does not say "that the candidate for Secretary . . . shall be a Resident Member," but that "of these (i. e. of the names of the persons selected by the Nominating Committee as candidates) . . . the Secretary, etc., shall be Resident Members."

In the obscurity of the wording, we are left to choose the more evident meaning. It may mean either that "of these candidates the candidate for Secretary shall be a Resident Member," or (omitting "of these") "the Secretary shall be, etc." If the former were the meaning, it could be complied with by the proposed candidate putting up at a New York hotel for a day or so prior to his nomination. He could move to Kansas the day after his nomination and remain there during the whole term of his Secretaryship. There could be no possible object in requiring that the candidate must be a New Yorker; but there is an object in requiring that the Secretary shall reside in New York, for otherwise he cannot devote to the Society's affairs that attention which they require.

I think we must certainly understand the Constitution as meaning (even though it is most imperfectly expressed) that the Secretary must be a resident member, whether nominated by the Nominating Committee or by "any five members," but I also think that an Associate who, upon his election, took up his residence in New York, would be a Resident Member within the meaning of Article VII., Section 4.

A. B.

As confirming the opinion of Messrs. Blair & Rudd, which was printed in the Railroad Gazette last week, on the matter of the eligibility of Mr. Trautwine to the office of Secretary of the American Society, we reproduce the following from Engineering News. It will be seen that it confirms the former opinion that an Associate or Junior is eligible to office.

Law Office of JAMES W. HAYES,
140 NASSAU STREET, New York, Nov. 20, 1890.

TO THE ENGINEERING NEWS PUBLISHING CO.:
My opinion has been asked respecting the eligibility for the Secretaryship of the American Society of Civil Engineers of John C. Trautwine, Jr., a non-resident Associate.

My attention has been directed to the Constitution of the Society, and especially to Article I., Sec. 2; Article III., Sec. 3; Article IV., Sec. 1; Article VI., Sec. 1, and Article VII., Secs. 4 and 5.

After considering these provisions, and referring to judicial decisions on analogous subjects, I am of the opinion that the weight of reason and authority favors the eligibility to office of an Associate or Junior, with all the powers belonging to the particular office. I am similarly of the opinion that it is sufficient that the Secretary should be a resident at the time of assuming the office.

I find no authority vested in the Board of Direction to decide upon the eligibility of candidates for office.

JAMES W. HAYES.

Position of Dwarf Signals.

Office of Supervisor of Signals,
New York Div. Penna. R. R.,
JERSEY CITY, N. J., Nov. 19, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In answer to the inquiry of XYZ (Railroad Gazette, Nov. 14), as to the proper method of signaling a double track railroad for direct and reverse movements at a crossover, I would say that this question involves more than the location of the dwarf signal in reference to a crossover between two tracks, for in order to give an answer that will hold good under all conditions, it is necessary to know what will make the best arrangement for the most complicated as well as for the most simple track plant.

I send you diagrams A, B, C and D herewith, illustrating four different methods of operating a four track system. The passenger tracks are shown by the heavy lines, and for the sake of simplicity I have omitted the towers, distant signals and detector bars.

The dwarf signals shown to the left of the diagrams illustrate the theory of placing them on the left-hand side of the movement. The dwarf signals to the right



of the diagrams illustrate the theory of locating all signals on the right-hand side. The left-hand arrangement is based on the assumption, as stated by XYZ, that this is usually the engineman's side when the train is making a reverse movement, and therefore if it is correct to place a signal for direct movements on the right-hand side, because it is the engineman's side, it would seem correct to place the signal on the left-hand side when the reverse movement is being made, because this is then the engineman's side. If this theory could be perfectly carried out, it would no doubt give excellent results; but the complications are such that it is impossible to make this arrangement perfectly satisfactory, as it requires the engineman to know the usual running direction of the track in order for him to determine whether he is making the reverse movement or not, as the use of the dwarf signal is not entirely confined to this class of movement; and if the movement is not a reverse movement, the dwarf signal is usually placed on the right-hand side, as in the case of the movement from a siding or in a yard, where the dwarf is used in place of the high signal. This at once causes considerable confusion. In some cases the dwarf is on the right-hand side of the track, because it is not a reverse movement, and in other cases it is on the left-hand side of the track, because it is a reverse movement.

You can readily see that if in some cases the signal is placed on the left and in others on the right, these signals will conflict with each other. For instance, I have had to show the dwarf signals governing movements from the siding of diagrams A, B, C and D on the left-hand side, contrary to the usual manner. If placed on the right, that would interfere with the dwarf signals for reverse movements on the main tracks. In diagrams C and D the dwarf signals in two cases are in line with the main line signals. The enginemen after passing the main line signals would be required to pass a dwarf signal on the right of his track, and he might find this signal in a red position, which would be somewhat confusing.

Until quite recently it was desirable to avoid placing dwarf signals between the tracks as far as possible, as on account of their size they were in danger of being struck by passing trains; but this difficulty has now been overcome by a very satisfactory dwarf signal that does not occupy any more space than the smallest form of pot signal.

The advantages of placing the dwarf signal to the right of the movement seem to outweigh the advantages of the other signal: 1st, uniformity; all signals are placed to the right of the movements. 2d, simplicity, in describing the signals in opening an interlocking system. 3d, safety, the natural result of the first and second; no confusing signals.

HENRY M. SPERRY,
Supervisor of Signals.

Pittsburgh, Cincinnati, Chicago & St. Louis
Railway Co. (Pittsburgh Division),
Office of the Superintendent,
PITTSBURGH, Pa., Nov. 20, 1890.

The idea of placing signal posts to the right is to have them out in plainer view of the engineman, so that he

can see them when approaching at high speeds. In the dwarf signals for back-up movements the speed is never great and the signal is seldom taken by the engineman at all; the position of the blade being indicated to him by a hand signal from a man on the car. Therefore, it is entirely immaterial, from the standpoint of train movement, whether the signal be on the one side or the other; but it is very much safer for brakemen and other trainmen to place them on the outside of the track, where they can be put full 7 ft. from the rail, than to place them between the tracks, where they could be stumbled over; therefore, whenever it is practical to do so, we place them on the outside.

J. J. TURNER,
Superintendent.

State of Illinois, Office of
Railroad and Warehouse Commission,
SPRINGFIELD, Nov. 20, 1890.

It is possible that conditions incident to the necessities of business at this particular point may present features not defined in the statement of the article or the accompanying diagram. If this crossover is located



near a grade crossing, and being a continuation of a Y or connecting track where it would be necessary to move head on through A to B and on the second track, and back up either through the same route or towards D, I would locate the first signal between track as at E and the second outside as at F. If this crossover is used independent of any yard connections and is away from station, I would locate the dwarf signals on the outside of track, for the reason that an engine would not be moving head on against the indicated current of traffic and would consequently be in backward movement while passing through crossover, and therefore, to have signal on engineman's side, I would place them outside.

CHAS. HANSEL,
Consulting Engineer

Chicago & Northwestern Railway Co.,
Chief Engineer's Office,
CHICAGO, Nov. 20, 1890.

In signaling a simple trailing crossover between double tracks, I think that the general principle of having all signals on the right-hand side of the track and pointing to the right when you are facing in the direction the movement is to take place should be maintained, even though there may be some slight inconvenience due to close quarters, and to the fact that the engineman may be obliged to cross from one side of the cab to the other in order to see how the reverse movement signals stand. The principal reason for this is that at a point where it is necessary to have four running tracks there will be no confusion whatever regarding the location of the signals for the proper movements, and an utter stranger on the line, after being instructed in the general principle of the arrangement of the signals, would be able to handle an engine without being in danger of making a false movement.

It also seems to me that simplicity in any rule of this kind is of the first importance, as there are times when men must act very promptly and without taking time to study out just where they are. If such a rule as the one given above is maintained strictly the translation of the meaning of the signals by the men will become a matter of intuition and will be much more likely to be done correctly than would be the case if the reverse movement signals were located in any other way.

EDWD. C. CARTER,
Prin. Ass't Engineer.

May I offer a word of friendly criticism of Mr. Grafton's letter in your issue of the 21st inst.?

There is a class of men, which happily grows smaller, very fond of discussing questions in which they say "theory" and "practice" differ; and thus has arisen a great contempt for "mere theorists" among practical men, and an equal contempt for "mere practical men" among the learned theorists, while above them both tower the powers of the land, the hope of the country, the successful men, whose theories are the results of most careful practice and observation.

The opinions of the theorist, as meant above, are of little weight for the reason that his knowledge is at best second-hand, subject alike to the misconstruction of its interpreter and to the fault of being behind the times; and the opinion of the "mere practical man" has the weight of his experience only. The opinions that we value are founded upon extensive knowledge of general opinion supplemented by personal experience, and the only theories that are worth recognizing are those founded upon all the facts which determine the best practice.

Every one knows that Mr. Grafton's practice is second to none in the country, and as a matter of fact he subordinates "theories" to what experience teaches him is wise; but what I object to is that, if he will pardon the

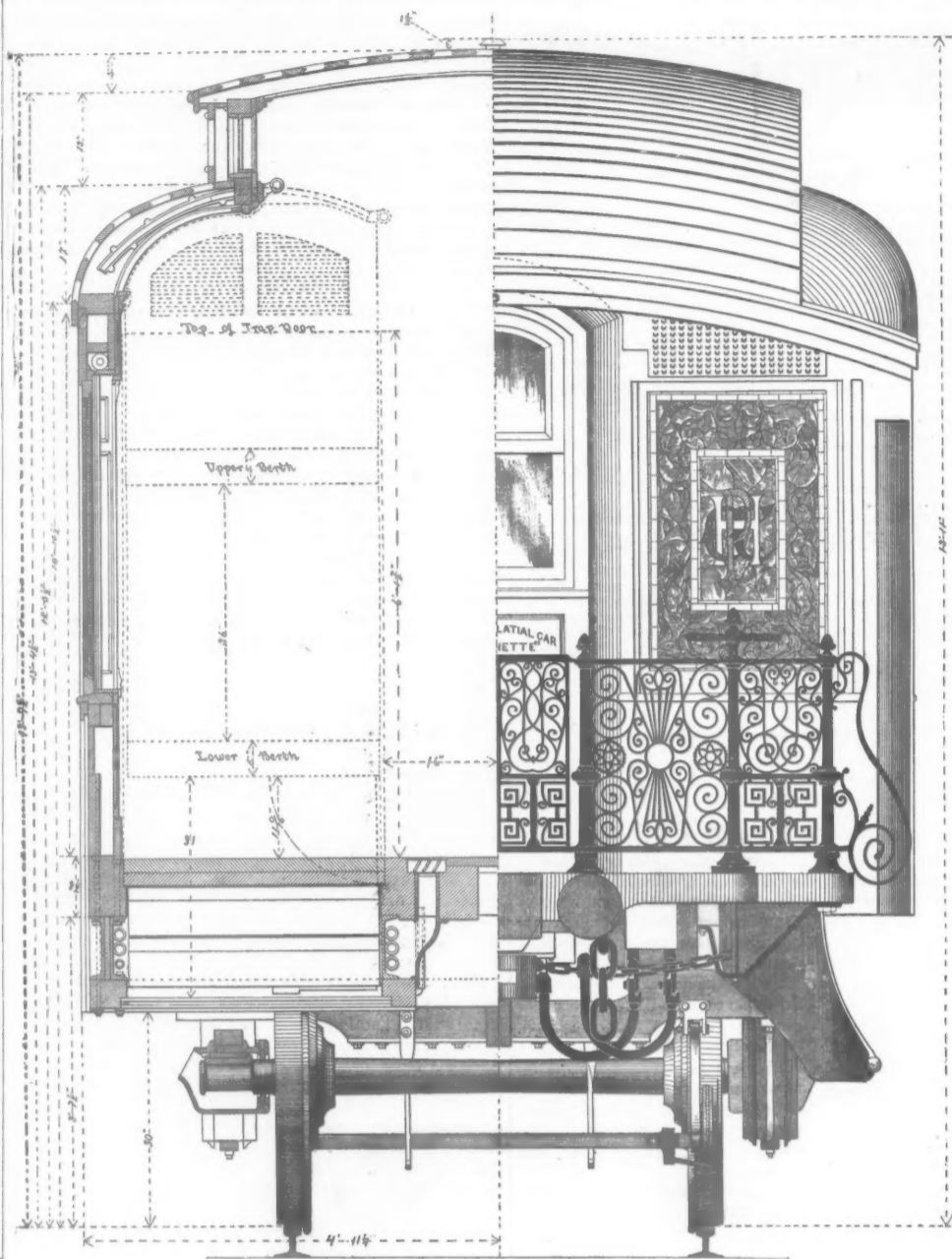


Fig. 4.—Half Cross Section Through Middle of Car and Half End Elevation.

HARRIS EXCURSION CAR "JEANNETTE."

bluntness, he should say in effect: "This is right, but we never do it because we find it isn't right."

Incomplete theories are no theories at all, and only the sum of all the "because" determines what is right.

If a pistol is known to shoot six inches to the left at 30 yards, don't say "I know I ought to aim at the bull's eye, but as I can't hit it I aim to the right;" just say "that rule applies only in special cases and should read, 'aim so as to hit.'"

If general experience determines that signals are safer and better outside the tracks and on the engineman's side of them, and if, because of the coincidence in right-handed roads, somebody made the rule read, "signals should be on the right side of the track," it does not follow that it is so. Let us get at the reasons and make the rules say what they mean.

May I take enough more space to offer my apologies for having already taken so much?

C. HERSCHEL KOYL.

The Harris Sleeping and Drawing Room Car.

[WITH AN INSET.]

As our readers will recall from previous announcements in the *Railroad Gazette*, the ideas of Mr. L. J. Harris, of Boston, concerning the feasibility of making a single passenger car which should satisfactorily serve for both day and night travel, were last year formulated into numerous patents on the various devices invented by him, and a company, the Harris Palatial Car Co., was organized to build cars under these patents. Such a car was built at the Wason Works, at Brightwood, (Springfield, Mass.), and we present in this issue drawings and perspective views illustrating it.

The car which has been built and which is shown in the illustrations is a private excursion or hotel car, and therefore contains a number of features which do not belong to a regular parlor or sleeping car. The first

noticeable characteristics of this car are its strength and beauty, every detail evidencing the fact that it has been built by experienced workmen under competent supervision. Mr. Harris has evidently availed himself of the best experience in all departments of car building, and the "Jeannette" is a credit to the Wason Works as well as to its owners.

But the chief purpose of this article is not to describe this particular car, but to explain its main feature, the devices for transforming the interior from a parlor to a sleeping car, and vice versa. These will be understood by reference to the accompanying illustrations, all but two of which are on the large inset. The smaller photographic view shows the main parlor when arranged for day travel, but with the berths of one section made up. Fig. 1 is a side elevation showing the principal features of the vertical and roof framing. Fig. 2 is a floor plan showing the principal features of the wooden floor framing. Fig. 3 is partial floor plan, showing the arrangement of the rooms. Four of the five berths on each side are cut out, to avoid excessive reduction of the scale of the drawing. Fig. 4 is a half end view and a cross section at the middle of the car. This cut shows the construction of the depressed floor or pocket which contains the berths during the daytime and the chairs during the night.

The construction of the berths is shown in figs. 4 and 5. During the day both of the berths of a section lie in the space below the floor, and the room above can be furnished with either revolving or movable chairs, the floor being provided with suitable sockets in which to fasten chairs having iron standards, while at night this socket leaves a smooth surface which does not interfere with the making up of the berths. The berths are elevated by means of a rack and pinion, the arrangement of which is shown in fig. 5. Before preparing to elevate them the section of floor over each is opened like a trap door, the sections of the floor being so constructed as to make a perfect upright partition. The floor is double, the first

'trap door' lifted forming one end partition and the second that for the other end. In each face of each partition are two racks, making four for each berth, and the corresponding pinions on the berth are connected by shafts and bevel gears so as to be all turned by a single crank at the middle of the berth at the side next the aisle.

After the berths are elevated, which is quickly done by means of the crank, a trap door, which was fastened up against the bottom of the lower berth, is let down, forming a front to the pocket, and the weight of the berth resting on it fastens it securely, protecting the baggage, etc., placed with the chairs in the space beneath. After the lower berth is in position the upper berth is run up a little higher, lids in the under berth are raised so that they support the upper one at each end, and similar lids on the upper berth are raised to form partitions above the sections of the floor which have been turned up.

The curtain bars are in sections and lie flush along the sides of the clere-story; they are on brackets which simply pull out of sockets, like a drawer, bringing the rods into position.

Among the important secondary or auxiliary objects sought by Mr. Harris in designing and building this car, and which he seems to have accomplished in a very thorough manner, are the following:

1. Lightness. By placing the centre of gravity lower than usual, and by supporting the upper berths from the floor instead of from the roof, as in ordinary sleeping cars, the necessity of using ballast is avoided and the car can be made lighter than ordinary sleeping cars of similar capacity.

2. The framing of the pocket, being made of channel iron and necessarily very strong, becomes incidentally

minings are of oxidized silver. The window shades are of broadcloth, with a border worked by hand to correspond with the border of the carpet, which is of a handsome design of peacock green with a renaissance border. The chairs are of mixed design, made of rattan and upholstered with orange chrome plush. Some of the chairs are reclining, others are tête-à-têtes, sofas and corner chairs. The ceiling is handsomely painted, the centre showing four allegorical pictures representing the four seasons. The car, when arranged for day use, has 25 chairs and two sofas. There are 68 mirrors in the car altogether, one of them, which will make the designer "solid" with the ladies, being 8 ft. long. This is in the ladies' lavatory.

The "Jeannette" is equipped with the Westinghouse air brake and air signal and combination Miller and Janney couplers. It is piped for continuous heating, and for this has Sewall couplers and the Harris patent coupler for coupling with other patterns. There is also a Mason heater in the car. The trucks have 42-in. Allen paper wheels and Westinghouse brake beams and shoes. The railings, brake wheels and trimmings are of solid bronze, made by T. F. McGann, of Boston. The solid bronze brackets on the sides of the car, to fill the corners occasioned by the depressed floor or "pocket," were made by J. L. Howard & Co., of Hartford, Conn. There is on each platform a connection enabling the brakeman to apply the conductor's brake valve. The car is wired for electric lights.

The office of the Harris Company is at 244 Washington street, Boston. The "Jeannette" has been exhibited to a large number of railroad men and others in New England during the past two months and is soon to be taken to New York, Washington, and thence to the West.

Buildings and Structures of American Railroads.

No. 9—SAND HOUSES.

BY WALTER G. BERG.

Sand houses have three distinct functions, namely, the storage of wet sand, the drying of the same, and the storage of the dry sand. They are usually provided at all points on a railroad, where engines are changed, or in connection with engine houses and coaling stations, where, in other words, engines are supplied with coal, water, oil, sand, etc., before starting on a run. Even where the amount of sand to be used is very small, it will be found more advantageous to dry it at the place where it is to be supplied to engines, than to attempt to ship dry sand from a large, central sand house at some distant point, because, if the weather be damp, the sand will collect moisture again during transit or while it store. It requires very little attention and labor to dry sand at intervals in small amounts with the ordinary cast iron sand dry stoves, and they do not, therefore, call for the regular employment of special help for that purpose.

The main consideration to be kept in view in designing a sand house is economy in handling the material and in the amount of fuel required in the drying process. In the operation of a sand house the several steps consist of storing the wet sand, keeping it as free from moisture as possible while in store, the drying process proper, the stocking of the dry sand, and, finally, the delivery of the dry sand to engines.

In storing sand it is best to put it under cover, but the structure should be arranged to admit plenty of light and air on pleasant days, the free circulation of dry air over the pile being very desirable. This is usually accomplished to a certain degree by leaving the sides of the shed open at the top, but the more effective construction is to introduce louvres or movable slat sash or shutters, which allow the house to be closed during very damp weather. Where the size of the house will warrant it, or steam is convenient, it will be found very advantageous to place a few steam coils around the sides of the store shed above the sand pile, or to hang them from the roof, so as to slightly heat the air that circulates over the piles.

Wet or green sand, as it is termed, is usually brought to the house in cars. A very good location for a sand house is under the tall track of a coal trestle, where this is feasible. Too much importance, however, should not be placed on an elevated delivery track, as the sand must be shoveled anyhow, except when delivered in hopper cars. In other words, it would not pay to construct a special incline and trestle approach to facilitate unloading sand into store from an elevated track.

The drying process is conducted in several ways, the one most used being by means of so-called sand drying stoves, of which there are a number of styles, the general features consisting of an ordinary cast iron stove, with shallow pans near the top, or surrounded with a conical retort or drum around the body of the stove. The sand is packed in the pans or retorts and a slow fire maintained until the sand is dry, when it is drawn off or scraped out through appropriate openings. Another form of a sand drier is a revolving sheet iron cylinder set at an angle in a furnace. Another method is to put the wet sand in a trough with a system of steam pipes forming a grating through which the sand, as it dries, gradually descends to the bottom of the trough, which

is open, allowing the dry sand to drop on the floor. It is claimed that this system is very efficient and economical, where copper steam pipes are used. In some sand houses fires are maintained in brick or stone flues under the sand pile. When the sand is thoroughly heated the fires are stopped until a fresh lot of wet sand is received.

After drying, the sand is generally screened and then shoveled into bins on the ground floor of the building or on a level with the footboard of engines. Another system is to elevate the dry sand by an endless bucket belt, an appropriate hoisting apparatus, a cold blast, or an elevator system of some kind, to storage bins overhead, from where it can be spouted down to the sand boxes of engines or drawn into buckets by the engine-men. The Erie Railroad has on its Delaware division a sandhouse, in which dry sand is elevated by a cold blast to a storage bin, from where it is discharged directly into the sand boxes of engines. In some sandhouses a large number of buckets are kept filled with dry sand on a platform adjacent to the track and on a level with the footboard of engines, so that the engine-men can pick up as many buckets of sand as they require and empty them into the sand box without the delay incident to drawing the sand or filling the buckets. Another system in use is to have large buckets with drop bottoms standing filled with sand alongside the track; when an engine stops for sand, the buckets are picked up and swung around over the sand box by means of a derrick arm or gallows frame, and then discharged upon releasing the catch. This method deserves mention for its simplicity, and it will give about as quick dispatch in supplying sand to engines as a more elaborate elevator and overhead storage bin system.

In designing a sand house, due regard must be paid to the quantity of sand to pass daily through the house. Where the usual help around a yard or engine house system is to be relied on for its operation, it is essential to provide systems that involve a minimum amount of constant attention and labor. However, the introduction of labor-saving contrivances should not be carried to extremes, as illustrated in a sand house of one of the leading Eastern trunk lines, where an elaborate trough-and-bucket system with belt conveyor is employed to take the wet sand to the drying troughs, a distance of about 10 ft., another bucket elevator being used to lift the dry sand to a platform 8 ft. higher than the floor of the drying room, a 10 horse power engine completing the plant. While this device might appear perfect at first glance, yet, in actual operation, it is a failure, requiring the constant attention of an engineer, and the output being entirely controlled by the speed with which a man can feed sand to the trough conveyor, which carries the sand a little farther.

The size and style of a sand house to be adopted at any particular point depend upon the importance of the location, the grades that the engines have to pass, the number of engines to be supplied daily, also whether the engine crew can be relied on to draw sand, or whether it is important to enable engines to take sand quickly without any assistance from the engine crew. As indicative, however, of the sizes in general use, the approximate dimensions of the following sand houses can be mentioned: Richmond & Alleghany, at Richmond, Va., 16 ft. 6 in. x 14 ft. 6 in.; Atchison, Topeka & Santa Fe, 16 ft. x 28 ft.; Lehigh Valley, at Perth Amboy, N. J., 54 ft. x 20 ft.; design for Philadelphia & Reading, 16 ft. x 16 ft.; Chicago, Burlington & Quincy, at Burlington, Ill., storehouse, 50 ft. x 29 ft., and sand dry tower 19 ft. x 19 ft.; Pittsburgh, Cincinnati & St. Louis, at Columbus, O., 91 ft. x 43 ft.; design for Lehigh Valley, 68 ft. x 18 ft.; Pennsylvania Railroad, at Connemaugh, Pa., 60 ft. x average width 27 ft.; Pennsylvania Railroad, at Pittsburgh, Pa., 16 ft. x 36 ft.; Pennsylvania Railroad, at Jersey City, N. J., 21 ft. x 20 ft.; Pennsylvania Railroad, at Tyrone, Pa., 20 ft. 6 in. x 12 ft.; Pennsylvania Railroad, at Huntingdon, N. J., 20 ft. 6 in. x 12 ft.; Pennsylvania Railroad, at Blairsville, Pa., 26 ft. x 15 ft. 6 in.; Pennsylvania Railroad, at Mifflin, Pa., 20 ft. x 15 ft.; Lehigh Valley Railroad, at Weatherly, Pa., 30 ft. x 20 ft.

The ordinary cast iron sand drying stove is to be recommended, especially where only a small amount of sand is required daily, and where it is desirable that the usual help in the vicinity should also look after the sand house. If steam can be introduced in the house, then a steam pipe sand drying trough with copper pipes will prove advantageous, especially where large amounts of sand have to be handled. In addition the trough system diminishes the possible loss from fire.

Another economical method, referred to above, is that employed on the Lehigh Valley, at Weatherly, Pa., and on the Philadelphia & Reading, at Cressona, Pa., where a fire is kept up in the flues under the sand pile for several days at a time. This method entails little labor, but, owing to the large quantities to be heated at a time, the sand dries very unevenly, besides being likely to collect moisture before being used. This last defect can be obviated by introducing steam coils at the top of the sand pile, as referred to above.

The lifting of the dry sand by elevators, hoists, or cold blast into an elevated bin, from where it can be shot down into the sand box, or drawn by the engine-men from a spout into buckets, is quite a feature, where large quantities of sand are to be handled daily, and one or more men are employed steadily for the sand service and it is an object to enable engines to take sand quickly. Similar results, however, without elaborate

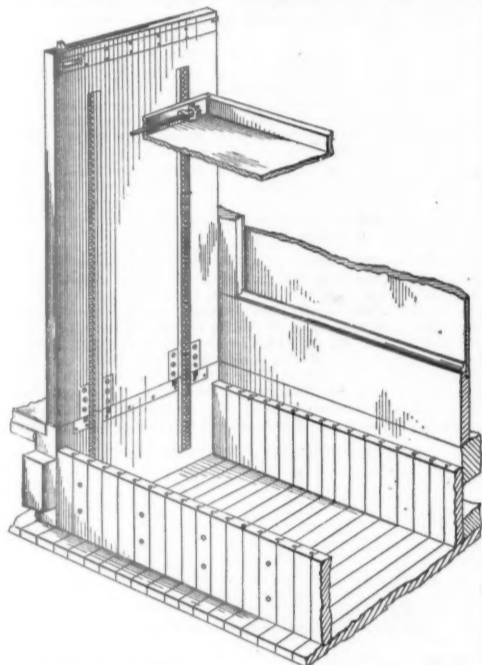


Fig. 5.—Showing Method of Lifting Berths.

serviceable to prevent slewing of the trucks in case of derailment. The longitudinal iron beams are tied at either end by a similar transverse iron beam, and this is located just far enough from the inner ends of the trucks to admit of running around ordinary curves. If one of the trucks were to get seriously out of line the stout iron framework would tend to powerfully restrain it from deviating beyond narrow limits.

3. The berths, being entirely independent of the seats used for day service, can be arranged to better advantage; they are 4 in. wider than those commonly made and the space between the upper and lower berths when in the usual position, is 8 in. greater than it is in ordinary sleeping cars. If only one berth is used it can be fixed at any desired height. The berths are made with spring beds and thick mattresses.

4. Passengers while sleeping can place their baggage and valuables in the space beneath the floor (with the chairs), and this space is then fastened in such a manner that it cannot be opened without disturbing the occupant of the berth. The occupants of upper berths have the same chance for observation, light and ventilation as those of the lower berths.

The arrangement of the rooms in the car described is best understood by reference to the explanations printed under fig. 3 in the inset. These explanations indicate only a portion of the numerous ingenious devices by which room has been economized and convenience promoted. The doors in the narrowest passageways (those opposite the kitchen and one at the other end of the car) are hung upon a patent hinge, designed by Mr. Harris, which leaves a perfectly flat surface whichever way the door is opened, thus making it impossible to catch the clothing on any projection.

The main apartment is 32 ft. long; its proportions are best seen in the smaller perspective view and in fig. 2. The interior finish of this room is polished mahogany, and the lamps, bundle-baskets and other metal trim-

*Copyright, 1890, by Walter G. Berg and condensed from a forthcoming book on the subject.

appliances and such a costly building, can be practically obtained by keeping a number of buckets filled with sand on a platform adjacent to the track at a convenient elevation, or by the use of a swinging derrick arm and a bucket with drop bottom.

The patentees of a cylindrical drying machine published in the *Railroad Gazette* of May 4, 1888, the following data for drying sand with a cast iron sand dry stove, as compared with the work of their patented machine:

	Railroad stove drier.	Patented cylindrical apparatus.
Pounds wet sand dried and screened per hour.....	675	16,000
Pounds common soft coal consumed per hour.....	24	180
Pounds water dried out per lb. coal burned	1	8½
Average percentage of water in the two different sands.....	.035	.093
Men's labor required.....	1	3
Expense of drying one ton of sand.		
Cost of labor at 15 cents per hour.....	\$4.44	\$6.05½
Cost of coal at 12½ cents per bushel.....	.11½	.03½
Cost of steam motive power.....	.03	.03
Cost of interest, repairs and depreciation.....	.02	.02
Total.....	.57½ cts.	.14 cts.

The following descriptions of sand houses are introduced as forming an interesting addition to above general remarks on the subject:

Sand House at Richmond, Va., Richmond & Alleghany Railroad.—The sand house of the Richmond & Alleghany

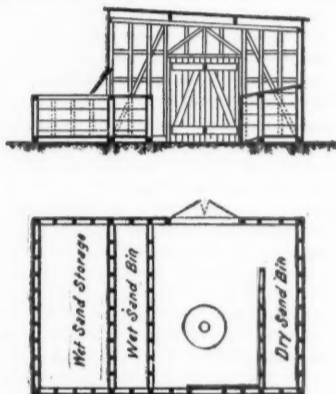


Fig. 1.

shown in fig. 1, is a good type of a cheap sand house, where a limited amount of sand is used. The house is a low frame structure, 16 ft. 6 in. x 14 ft. 6 in., with a 6 ft. 6 in. x 14 ft. 6 in. open bin adjoining one end of the building for the wet sand. In operating this house the wet sand is delivered from cars into the open bin, and from thence it is shoveled, as required, through an opening in the side of the building into an interior storage bin for wet sand. A cast-iron sand dry stove is located in the middle of the house, which is filled from the wet sand

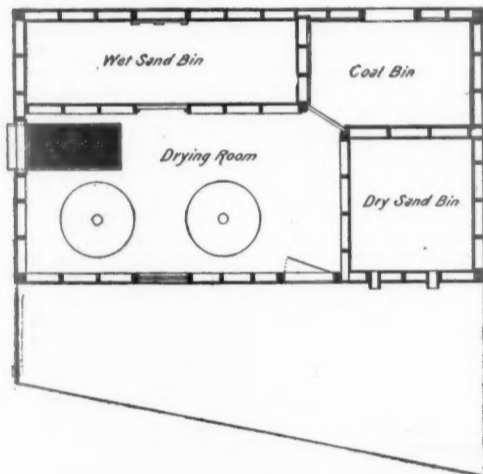


Fig. 2.

bin. As the sand dries, it drops to the floor through openings in the sides of the stove, from where it is thrown on a screen placed over the dry sand bin at the other end of the building. The enginemen are required to enter the house and fill their buckets with sand directly from the dry sand bin.

The frame is 10 ft. high on the front of the building and 9 ft. on the rear. The principal sizes are as follows: sills, 4 in. x 6 in.; plates, 4 in. x 4 in.; corner and door studs, 4 in. x 4 in.; intermediate studding, 3 in. x 4 in., spaced about 18 in.; nailers, 3 in. x 4 in.; rafters, 2 in. x 6 in.; posts for bin partitions, 3 in. x 4 in.; rails for bin partitions, 4 in. x 6 in.; floor in bins, 2 in.; outside sheathing, ¾-in. vertical boards with battens; roof sheathing, ¾-in. boards, covered with tin.

While, as stated above, this is a representative design for a cheap sand house, it could be improved by roofing over the outer wet sand bin, and the second handling of the wet sand from the outside bin to the interior one should be avoided.

Sand House, Atchison, Topeka & Santa Fe Railroad.—The sand house in use on the Atchison, Topeka & Santa Fe, shown in figs. 2 and 3, is built on a similar plan to the foregoing one, excepting that it is on a larger scale and is arranged for two sand dry stoves. The building is a one-story frame structure, 16 ft. x 28 ft. and 9 ft. high from sill to plate, with a double pitched roof. The wet sand is shoveled from cars through an opening in the side of the house into the wet sand bin, which is 6 ft. wide and 16 ft. long. From this bin the sand is fed to the sand dry stoves as fast as required, and when dry the sand is thrown over a sand screen, from where it is put into the dry sand bin facing the track traveled by

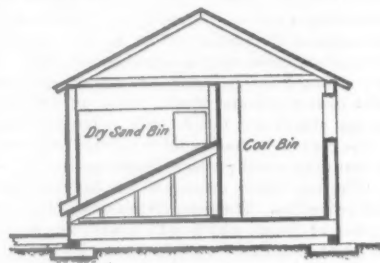


Fig. 3.

the engines. The floor of the dry sand bin is inclined so as to form a hopper, the sand being drawn on the outside of the building through a funnel-shaped appliance with a stop gate. A bin to keep the supply of coal required for the stoves is located in one corner of the house. The arrangement of the screen for screening the sand is noteworthy. Its upper end is hinged to the side of the building on a level with the sill of a small window, and its lower end is provided with a recess or pocket to catch stones and rubbish that do not pass through the screen. By means of a rope running over a pulley in the roof of the building and attached to the lower end of the screen, the latter is raised and the accumulated rubbish in the pocket discharged through the window without extra handling.

The principal sizes used are as follows: Sills, 6 in. x 6 in.; studs, 2 in. x 6 in., spaced 24 in.; plates, 2 in.

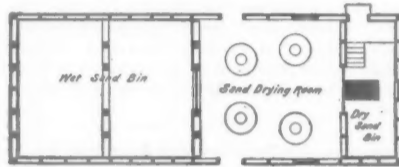


Fig. 4.

x 6 in.; floor joists, 2 in. x 12 in., spaced 16 in.; floor, 2-in. plank; rafters, 2 in. x 4 in., spaced 28 in.; lining of wet sand bin, 1-in. boards; lining of dry sand bin, 1-in. boards and No. 11 tank iron; lining of coal bin, 2-in. plank.

The interior arrangement of this building is very well planned with the exception of the location of the sand screen, which should be nearer the dry sand bin, so as to avoid cross movements and extra handling of the sand in its passage from the wet to the dry sand bin, unless the wet sand is screened before being put in the driers, in which case the location of the screen is all right.

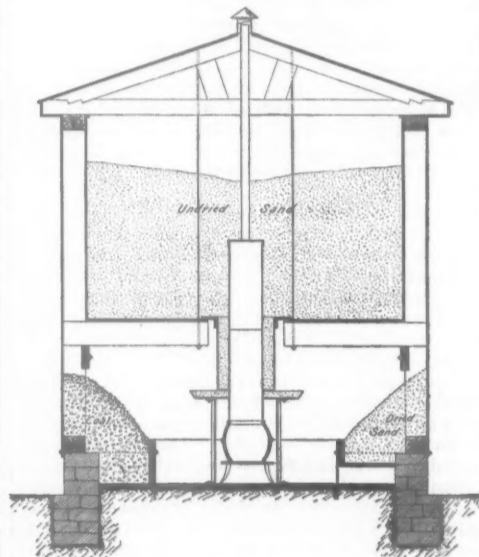


Fig. 5.

Sand House at Perth Amboy, N. J., Lehigh Valley Railroad.—The sand house of the Lehigh Valley at Perth Amboy, N. J., shown in fig. 4, is a one-story frame structure, 54 ft. x 20 ft., built under the tail track of the engine coaling trestle at that point. The house is divided into three compartments, one for the storage of wet sand, the middle one for the cast-iron sand dry stoves, of which there are four, and an end compartment for the storage of the dry sand. The sand is dropped from hopper cars or shoveled off sideways from flat cars through hatches in the roof into the wet sand bin. The sand is then shoveled or wheeled through an opening in the partition wall to the sand dry stoves. The dried sand drops on the floor around the stoves and is thrown on a screen placed over the dry sand bin. A small door

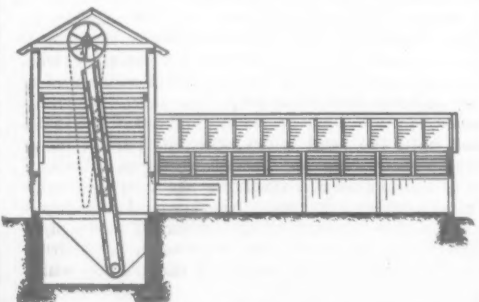


Fig. 6.

and platform are provided at the end of the dry sand bin on the side of the house next to the track. The enginemen step off from the footboard of the engine, enter the house, and take sand directly from the bin, or, in busy times, buckets of sand are kept on the platform to give quicker dispatch to the engines.

As regards economy of labor, compactness of design and cheapness of construction, this house is one of the best known to the writer. It would be a desirable improvement to have the same arrangement of the screen over the dry sand bin, so as to discharge the refuse and gravel outside of the house instead of on the floor of the sand drying room in front of the dry sand bin, as used in the sand house of the Atchison, Topeka & Santa Fe, described above.

Sand House Design, Philadelphia & Reading Railroad.—A sand house design made for the Philadelphia & Reading, shown in fig. 5, represents a frame building, 16 ft. x 16 ft. and about 18 ft. high. In the center of the building there is an iron sand dry stove with a large drum on top reaching up into a wet sand bin located overhead. An ordinary stove pipe or funnel is connected with the drum and projects up through the roof, it being the intention to utilize the heat of the gases ascending from the stove to effect a preliminary warming or drying of the sand, before it drops automatically into the large shallow drying pan encircling the stove, as fast as the dry sand is drawn from the pan. While in this plan

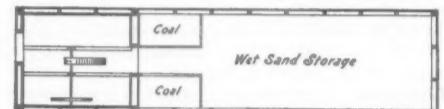


Fig. 7.

there is no labor connected with the placing of the wet sand in the drying pan, there is extra labor connected with placing the sand in the elevated bin, unless dumped from an elevated track. To allow the entire contents of the bin to run automatically into the drum, the floor of the bin should be hopper shaped. This design is interesting, however, as marking a step in the development of sand houses, but it is costly and not to be specially recommended.

Sand House at Burlington, Ill., Chicago, Burlington & Quincy Railroad.—The sand house of the Chicago, Burlington & Quincy, illustrated and described in the *Railroad Gazette*, July 22, 1887, is a brick structure of considerable proportions, divided into a wet sand store, 50 ft. long by an average width of 29 ft., and a dry sand tower, 19 ft. by 19 ft. The height of the sand dry store is about 24 ft. to the eaves, and that of the tower about 33 ft. This plant has several good and economical features that can be recommended for use where large quantities of sand have to be handled and the quick dispatch of engines is important.

Sand House at Columbus, O., Pittsburgh, Cincinnati & St. Louis Railway.—The sand house of the Pittsburgh, Cincinnati & St. Louis, was shown in the *Railroad Gazette*, April 22, 1887. It is divided into an open frame shed, 60 ft. x 43 ft., for the storage of the wet sand, and a brick dry sand house, 31 ft. x 43 ft. The shed is 15 ft. high from sill to plate, and the brick building is 21 ft. high from ground to the eaves. The system of operation is to shovel the wet sand into the store house through the sides of the shed, from where it is wheeled through a door in the back wall of the brick dry sand house to the

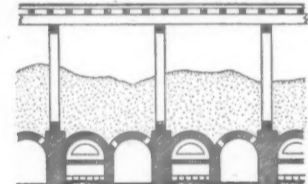


Fig. 8.

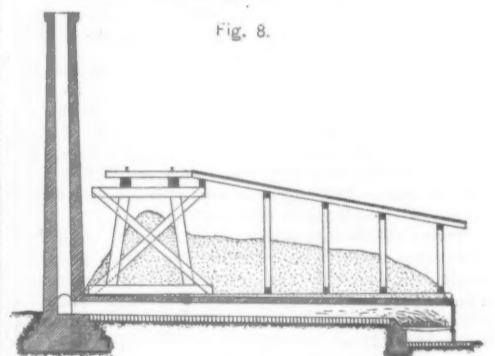


Fig. 9.

driers, which are located on the floor of the brick house, and consist of wrought-iron troughs, traversed by several rows of steam pipes, about 2½ in. apart. The wet sand is thrown into the trough, and is held by the pipes while it is wet. As it dries, it gradually descends between the pipes till it drops to the floor. It is then screened and shoveled into the dry sand bin, located on the ground floor of the house, from where enginemen take the sand as they require it. The wet sand house is stated to be of sufficient capacity to hold a supply for the four winter months, the average consumption in these months being about 17 carloads per month.

Sand House Design for Lehigh Valley Railroad.—A sand house, designed for the Lehigh Valley Railroad, shown in figs. 6 and 7, represents a good combination of the principal requirements of a large sand house, utilizing some of the distinctive elements of the sand houses at Burlington, Ill., and at Columbus, O. The building is divided into a storage house, 50 ft. x 16 ft., and a dry sand house, 16 ft. x 18 ft. The entire building can be a frame structure, or the store house can be a frame shed with a more substantially constructed dry sand house. The method of operating the house is to shovel the sand from cars through the sides of the storage shed into store. The sand is then wheeled, as required, to the sand driers on the lower floor of the dry sand tower. After drying and screening, the sand is thrown into a hopper and hoisted by a bucket elevator, operated by hand, to a dry storage bin

in the upper part of the tower. This bin is hopper shaped, and allows sand to be spotted directly to the sand box of an engine on either side of the tower. Small bins for the storage of coal used for the drying process are located between the sand store and the tower. This style of sand house is especially economical where large amounts of sand have to be handled. Where it is feasible the location of the house at the end of the tail track of a coal trestle is desirable to decrease the labor of storing the wet sand.

Sand House at Cressona, Pa., Philadelphia & Reading Railroad.—The sand house of the Philadelphia & Reading at Cressona, Pa., shown in a general way in figs. 8 and 9, represents a method of drying sand by means of arched brick flues under the sand pile, with fires at one end and connected at the other with a stack. The wet sand is dumped on the flues from overhead trestling and the fires started and maintained until the sand pile has been thoroughly heated throughout. The flues are about 3 ft. wide and 40 ft. long. Alongside of each flue is a similarly built archway under the sand pile, by means of which sand is drawn into wheelbarrows through openings in the arch, thus allowing the bulk of the sand in the pile to be drawn out without shoveling. The sand pile is protected from the weather by a shed built over it.

Sand Drier at Connemaugh, Pa., Pennsylvania Railroad.—The sand drier of the Pennsylvania Railroad, in use at Connemaugh, Pa., published in *Engineering*, June 28, 1877, follows a system of drying sand by a wrought iron cylinder, 2 ft. in diameter and 10 ft. 9½ in. long, inclosed in brickwork. The cylinder is covered with No. 9 sheet iron for a length of 8 ft. 8½ in., and the remainder with wire netting of three meshes to the inch. This cylinder is mounted on a 2-in. square shaft and set at an angle over a furnace. At the upper end the shaft revolves in an ordinary bearing, and at the lower end in a bearing consisting of two cast iron anti-friction rollers carried on a wrought iron bracket, the shaft resting on a steel set screw. The sand is fed into the upper end of the slowly revolving cylinder and, in descending, is exposed to the heat of the hot gases from the furnace. The sand is dry by the time it reaches the open wire work portion of the cylinder and drops through the network to an inclined delivery chute.

Sand House at Weatherly, Pa., Lehigh Valley Railroad.—The sand house of the Lehigh Valley Railroad at Weatherly, Pa., is a very simple and substantial structure, in which the sand is dried in bulk by means of flues built under the floor of the house. The building is of stone, 20 ft. x 30 ft. out to out, and about 10 ft. high from ground to eaves. It is located at the end of the tail track of a coal chute trestle, and the sand is dumped into store through hatches in the roof. Four transverse flues are built under the floor connecting with a large longitudinal flue, which opens into a chimney at each gable end of the house. The house is filled about once a month, and the fires maintained for about a week, sufficing to heat the entire contents. About three tons of refuse coal from the coal dump is used per month. The storage capacity of the house is about 70 tons of sand. In the winter months about 35 tons are used monthly, which amount keeps 15 heavy grade engines supplied with sand.

This system is simple, very economical and liable to run for years without repairs. It is claimed, however, that the sand is not dried uniformly throughout the pile, and that the sand nearest the flues is scorched and rendered lifeless. But the fact that this house has been operated successfully for years at the foot of a heavy grade on a much-traveled road would seem to justify the conclusion that the system of drying sand by flues underneath the sand pile is not to be considered an absolute failure. If the depth of the sand pile were reduced and the flues carried up through the pile, so as to distribute the heat more uniformly, better results could be expected.

Design for Sand House, Lehigh Valley Railroad.—A design for a sand house on the Lehigh Valley Railroad contemplates utilizing the general features embodied in the Weatherly sand house of the same road, as described above, with the improvement of decreasing the depth of the sand overlying the flues during the heating process, so as to be able to reduce the degree of heat required and secure greater uniformity in drying. The sand after being dried in small batches on top of the flues is removed to a dry sand storage bin on the ground floor or elevated, as desired. The building has three compartments, one for wet sand, the middle one for the drying process, and the third one for the dry sand storage bin. A small boiler connected with a steam pipe coil system is provided to dry the air in the sand stores on damp days, and also to effect a preliminary drying of the sand. Two flues are located under the floor of the drying room, fired at one end from the outside of the building, and connected with a stack.

The Time Convention and the Coupler.

When the General Time Convention's Committee on Safety Appliances approached the subject of an automatic freight car coupler it addressed a circular letter to the railroads asking certain information. Responses were received from 58 companies having 388,000 cars in freight service. The Committee regretted that there was not a more general response to the circular, but considered the information obtained sufficient to warrant it in recommending the adoption of the Master Car Builders' type as the standard coupler of the members of the Time Convention. This recommendation was adopted, as is now well known, at the convention held in New York, Oct. 8. Below we give the Committee's synopsis of the replies to the circular, abbreviating somewhat the questions and answers.

1. Do you consider it essential in the operation of long trains equipped with air brakes that there should be a close coupling; that is, spring slack instead of loose slack? A. 50, yes; 1, no.

2. Responses unanimous in favor of an automatic freight car coupler.

3. Of the various types of automatic coupler 32 roads have used the M. C. B. and 10 others have been used by one or two roads each.

4. What has been your experience with automatic freight car couplers? The answers to this question are somewhat difficult to summarize. In general it may be said that the results have been favorable considering the hard test to which the couplers are put when used with link and pin. Trouble has been found from the use of

inferior material in some cases. Many knuckles have been broken by running the cars in trains with others fitted with the link-and-pin coupler. One road replies that the M. C. B. standard is too light, one that new lines should have been used, giving a stronger coupler, and the passenger couplers brought to those lines. On the whole the experience, so far as it has gone, may be summed up as favorable to the M. C. B. type, subject, of course, to improvements in material and in detail.

5. The course of the M. C. B. Association in fixing upon a type rather than a specific coupler is approved by 51 to 2. The roads voting in the negative are the Chicago, St. Paul & Kansas City and the Delaware & Hudson. No reasons, however, are given.

6. Do you entirely approve of any of the couplers within the M. C. B. type? If so, which? A. 20, yes; 11, no. The affirmative answers include 17 roads with the Janney, 2 each Hinson and Thurmond, and 1 each of the Gould, Van Dorston, Timms, Hein and Chicago Automatic.

7. If you entirely approve of none of the couplers of the M. C. B. type, will you please state your objections to the one which most nearly satisfies you? A. The specific objections are the large number of uncoupling devices, causing expense and repairs; the coupler too light; weakness of the knuckles; cost and rapid destruction; difficulty of coupling with the link and pin; small bearing surface between tail of knuckle and lock; line of tension on one side of the centre line of coupler; liability to become uncoupled.

8. Asks preferences for any other type of coupler than the M. C. B. A. One road prefers the Marks and one the Hein. No other preferences are expressed.

9. How would you propose to accomplish the general introduction of such a coupler, taking into consideration the very large number of couplers of the M. C. B. type already in use? A. Responses to this question were few and vague. It was suggested that each road be allowed to experiment, and that the fittest would survive. One road suggests a very thorough test, by competent persons, with trains on heavy curves and grades, under the direct supervision of the roads interested. Another road suggests the adoption of the best as determined by a board of mechanical experts and legislating the rest out of existence. Another road suggests that the coupler should be placed on all new equipment, and on all cars shipped for general repairs.

10. Asks the number of cars included in the equipment of the lines replying. This has already been stated as about 388,000 in freight service.

11. How many in each batch of these cars are equipped with automatic freight couplers? The answers are as follows:

Janney.....	22,931	Marks.....	2,594
Hinson.....	1,541	Ames.....	557
Gould.....	4,556	Cowell.....	25
Van Dorston.....	4,000	Wilson-Blocker.....	1,250
Thurmond.....	3,060	Dowling.....	363
Timms.....	500	Keystone.....	10
Hein.....	1,176	Miller.....	29
Chicago Automatic.....	251	Standard.....	388
Mills.....	550		
Lorraine.....	10	Total.....	43,719

12 and 13 call for the cost of maintenance per car per year of common link-and-pin and automatic couplers. The few replies are tabulated below:

	Link and pin.	Automatic.
Allegheny Valley.....	\$2.54	\$1.20 (Janney)
Chicago & N. W.....	1.45 (material only)	
Housatonic.....	4.00	2.00
Kansas C., Fort Scott & M.....	1.25	
Newport News & M. V.....	1.90	
New York & N. E.....	2.49	
New York, Prov. & B.....	3.00 (about)	
Pennsylvania Co.....	3.45 (estimate)	
Italeigh & Gaston.....	2.80	
South Florida.....	4.80 (drawheads only)	
Wisconsin Central.....	2.76	

14. Calls for a report of the percentage of coupler bodies and knuckles broken, and of the most frequent breakages. The percentage of broken coupler bodies is from one-half of 1 per cent. to 3½ per cent.; of knuckles from 1 per cent. to 7½ per cent. The most frequent breakages are indicated on diagrams, but these have been already more fully given in former issues of the *Railroad Gazette*, notably in the report of the breakages of 124,441 Janney couplers published Nov. 7, and in the report of broken couplers on the C., B. & Q., published June 6. Other information included under question 14 is as follows: About an equal number of breakages is attributed to defective material and to improper distribution of metal. The best material for coupler bodies is given as, iron by votes representing 33,910 couplers, and steel by votes representing 12,424 couplers. The best material for knuckles is given as iron by votes representing 19,938 couplers, and steel, 34,156.

15. With couplers of the M. C. B. type have you experienced any disadvantages from an operating standpoint that did not exist with the link-and-pin? A. The disadvantages are due to lack of uniformity, which existed likewise before the use of automatic couplers.

16. Asks for information as to decrease in injuries to trainmen, greater facility in making up trains, diminution of the shocks in starting and stopping, and elimination of accidents due to bunching of trains in sags and hollows. A. The general drift of the answers shows that those who consider that they have had sufficient experience have realized advantages, while none seem willing to deny that they exist.

17. Which do your trainmen prefer, the link-and-pin coupler, couplers of the M. C. B. type, or other automatic couplers? A. If the M. C. B. type were the pre-

vailing one this question would probably be answered unanimously in its favor. So long as it has to be used in connection with link-and-pin many will object to it.

18. In all cases where the M. C. B. type has been adopted it is generally to be put on all new cars of all classes, also on all old cars requiring new drawheads. The time when the companies replying expect to have all cars equipped with this coupler varies from two to ten years.

Wear of Rails in Tunnels.

The two sections of worn rail which are shown here illustrate the difference in the wear and deterioration of rails in and out of tunnels. They are from 67-lb. rails put in the track April, 1883, and taken out February, 1890.

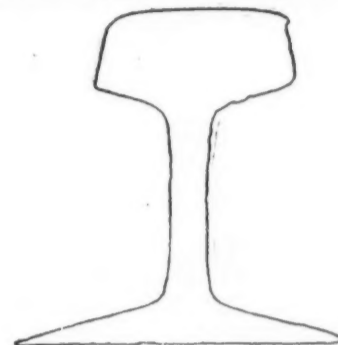


Fig. 1.

Fig. 1 is from a rail inside the Musconetcong tunnel on the New Jersey Division of the Lehigh Valley Railroad. Fig. 2 is from a rail just outside of the tunnel, in the same track. The dotted line on fig. 2 shows the original



Fig. 2.

section as well as it could be traced from a blue print which had shrunk somewhat. The natural wear and the effect of corrosion may be well compared in these two sections of rails, which had been subjected to the same traffic, under conditions identical in every particular except than one rail was in a tunnel and the other was outside.

Circular of the Plant System Explaining Rules 96-99 of the Standard Code.

The following circular explains itself, and is referred to on the editorial page:

Savannah, Florida & Western Ry. Co., Charleston & Savannah Ry. Co., Brunswick & Western R. R. Co., Alabama Midland Ry. Co., Office General Manager, SAVANNAH, Ga., Oct. 25, 1890.

CIRCULAR TO FLAGMEN.

Your attention is hereby called to the rules which prescribe your duty under the different circumstances in which you may be placed.

On Passenger Trains.

No. 1. At regular stations noted on schedule as a stopping place for that train, and standing at the usual place for it to stop, see Train Rule 229. If your train stands over five minutes, you must go back with danger signals and protect your train, as provided in Rule 96.

No. 2. At regular stations noted on schedule as a stopping place for that train, but not standing at the usual place for it to stop. This is an unusual stop, and you must comply with Train Rule 96.

No. 3. Stopping at stations not noted on schedule as a stopping place for that train. This is an unusual stop. See Train Rule 96.

No. 4. Stopping for wood or water between stations. This is an unusual stop, to be governed by Rule 96.

No. 5. Stopping between stations for engineer to examine something about his engine. This is an unusual stop, and you must be governed by Train Rule 96.

No. 6. Stopping between stations to pack hot boxes. This is an unusual stop. You will be governed by Train Rule 96.

No. 7. Any other stop between stations. See General Manager's Order No. 300, also No. 290, which reads "all other stops must be considered unusual stops." You will be governed by Train Rule 96.

For Freight Trains.

No. 8. At regular stations not noted on schedule as a stopping place for that train, and standing at the usual place for it to stop. You will assist the conductor in shifting switches, discharging freight, etc., but if the train is delayed 20 minutes beyond its scheduled leaving time, you will be governed by Train Rule 97.

No. 9. At regular stations noted on schedule as a stopping place for that train, but train over-lapping

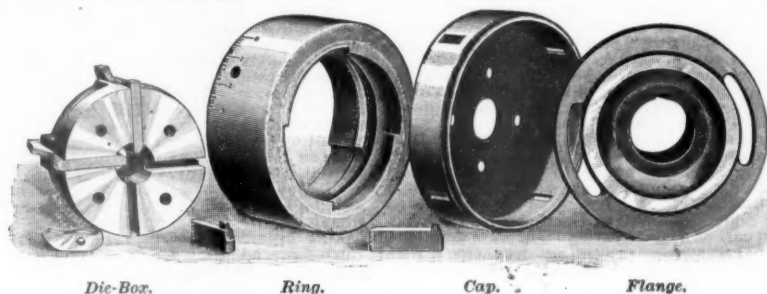


Fig. 1.

The Merriman Bolt Cutter—Details of Cutter Head and Die.

tail, and fig. 2 is a full size illustration of a No. 2 die for cutting $1\frac{1}{2}$ -in. bolts.

The main improvements are, of course, in the cutter head. There are four parts to the head—the die box, provided with slots, into which the cutting dies are set and rigidly held, the ring surrounding the die box and holding or pressing the dies up to their work of cutting the thread, the flange fitted to slide longitudinally upon the machine spindle, and the cap for inclosing the die box. To the rear of and acting upon each of the cutting dies is placed a lever for raising or lowering the dies to or from their work. The flange and ring are fastened together by screws working in slots in the flange and, being drawn back by means of the lever shown in fig. 1, the rear ends of the small inner die lever are depressed, and the front ends engaging with a lug or projection on



No. 2 Die. Full Size.

Fig. 2.

the cutting die lifts the die away from the bolt when cutting is completed. If the ring be moved forward again, it strikes the incline on the cutting die and forces it down to position ready for work. On the inside of the ring are formed three sets of eccentric circular wedges, upon the outer one of which the dies bear while cutting, and the slot screws of the flange being loosened, the ring may be rotated upon the die box and dies and the eccentric wedges brought to bear upon the dies for adjustment in cutting the bolts for a tight or loose fit of nut. There are four cutting dies, and the cutting is completed with a single inward movement of the bolt. When the required length or reach of thread is reached, the machine lever is moved back, the dies raised and the bolt withdrawn, leaving place for the next bolt, which may be at once inserted without stopping the machine.

An index is provided, whereby the machine can be instantly adjusted to cut any number of bolts of a required diameter and fit.

Train Accidents in the United States in October.

NOTE.—This record has, in consequence of the growth of the railroad system of the country, come to require so much space in the paper that we have determined to abbreviate it. The accounts of accidents will be gathered from newspapers and other sources the same as is now done, and the summaries given in the editorial columns will be made in precisely the same manner as heretofore; but detailed accounts will, as a rule, be printed only of accidents which cause death or injury to persons. Train accidents resulting from unusual or peculiar causes, or which are for any reason of exceptional interest to railroad men generally, will, however, be reported as before, regardless of this rule.

COLLISIONS.

REAR.

1st, on Chattanooga, Rome & Columbus, near Summerville, Ga., a freight train broke in two and the rear portion ran into the forward one on a trestle, derailing 3 cars and damaging the trestle. One trainman injured by jumping.

1st, on Housatonic road, near Winnipaug, Conn., a mixed train broke in two on a curve, and the detached portions collided, derailing a freight car and tearing away a platform of a passenger car. Brakeman injured.

1st, on Maine Central, at Great Works, Me., an extra freight train ran into the rear of a construction train, ditching the engine and throwing the caboose on top of a box car in front of it. Seven employes in the caboose were injured, 1 of them fatally.

2d, on New York, Lake Erie & Western, at Waverly, N. Y., a freight train broke into three parts and the two rear portions afterward collided on a bridge, wrecking several cars and killing the conductor.

2d, on St. Louis, Arkansas & Texas, near Pittsburgh, Tex., a freight train ran over a misplaced switch and

into some cars standing on a siding, badly damaging both engines. Fireman killed.

4th, on Atchison, Topeka & Santa Fe, at Norman, I. T., a passenger train collided with a box car which the wind had blown from a siding on to the main track, doing considerable damage. Baggage-master fatally injured.

7th, on Virginia Midland, near Culpeper, Va., a freight train broke in two and the two portions collided, wrecking a number of cars and killing 2 brakemen.

8th, on Central of Georgia, near Anderson, S. C., a freight train ran into the rear of a wood train, doing considerable damage. One employe killed and 2 injured.

9th, on West Shore road, near Yankee Hill, N. Y., a freight train broke in two and the rear portion ran into the forward one, damaging 2 cars and derailing a number of others. Brakeman seriously injured.

9th, on Philadelphia & Reading, near Paulbrook, Pa., freight train broke in two on a grade and 15 cars ran back and into the head of a following freight, wrecking 30 cars and the locomotive. Brakeman killed and engineer and fireman injured. The wreck caught fire and was mostly consumed.

10th, on Boston & Maine, at Hampton Falls, N. H., a freight train ran into the rear of a preceding freight standing on the main track, badly damaging engine and caboose and derailing a number of cars. Fire broke out and the wreck was partially consumed.

11th, on Illinois Central, near Thomasboro, Ill., a freight train broke in two and the detached portions afterward collided, damaging several cars and killing two tramps.

11th, on Chicago, Burlington & Quincy, near Tyrone, Ia., a freight train collided with a box car standing on the main track. The engineer, who jumped from the cab, was run over by another train and killed.

12th, on New York, Lake Erie & Western, near Craigville, N. Y., a light engine ran into a preceding freight train, wrecking caboose and 1 car, which caught fire and were burned up. Two trainmen injured.

12th, 11:30 p. m., on Southern Pacific, near Eagle Pass, Tex., a westbound passenger train collided with a stock car which had been blown onto the main track from a siding, ditching the engine and baggage car. Engineer hurt.

15th, on Chicago, Burlington & Quincy, at Altoona, Ia., a freight train ran into the rear of a preceding freight, badly damaging engine and 10 cars, a number of which were loaded with cattle. Fireman injured.

15th, on Chicago, St. Paul & Kansas City, near Oelwein, Ia., a freight train ran into the rear of a preceding freight, killing a tramp.

15th, on Walpole Branch of the Old Colony road, which is now building, a construction train ran into a flat car, killing an employe and injuring 13 others.

15th, on Iowa Central, near Coppack, Ia., a freight train ran into the rear of a preceding freight, wrecking engine and 1 car and injuring 1 trainman.

16th, on West Shore, at New Baltimore, N. Y., a fast cattle train waiting for orders was run into at the rear by a following freight on a curve, damaging caboose and one car.

16th, on Wisconsin Central, at Neenah, Wis., a light engine ran into the rear of a freight train standing on the main track, doing slight damage. Engineer hurt. The accident is said to have been due to absence of tail lights on the freight.

17th, on Chicago, Burlington & Quincy, near Monmouth, Ill., a passenger train moving at speed ran over a misplaced switch into some box cars standing on a siding, wrecking engine, mail car and a number of box cars. Engineer and fireman injured by jumping and 3 men unloading the cars on the siding were badly scalded by escaping steam from the engine.

19th, on Lake Shore & Michigan Central, near Silver Creek, N. Y., a freight train which had broken in two on an ascending grade was run into by a following train, wrecking several cars and throwing some of them over upon the main track. The foremost train was not properly protected by flag.

21st, on Pittsburgh & Lake Erie, at Fallston, Pa., a freight train broke in two, and the rear portion was run into by a following freight, doing considerable damage. Engineer killed by jumping.

21st, on New York Central & Hudson River, near Athens Junction, N. Y., passenger train containing employes of the road, which had come to a stop, was run into by a following light engine, badly damaging 2 rear coaches and disabling the engine. Several occupants were injured.

22d, 7 a. m., on Union Pacific, near Armourdale, Kan., an east-bound passenger train, the speed of which had been reduced in consequence of a delayed freight train ahead of it, was run into at the rear by a following Chicago, Rock Island & Pacific passenger train, which was running rapidly. The engine of the latter and the rear sleeping cars of the former were badly damaged. The engineer was killed and another employe and 3 passengers were injured. A dense fog prevailed at the time.

22d, on Housatonic road, near New Haven, Conn., a freight train ran into the rear of a preceding freight, damaging engine, caboose and 3 cars. Fireman seriously injured.

24th, on Columbus, Shawnee & Hocking Valley, at Muskingum, O., a freight train ran into the rear of a string of gravel cars left standing on the main track, and the conductor was killed.

24th, on Long Island road, near Greenport, N. Y., freight train broke in two and the rear portion ran into the forward one, wrecking 2 cars. Conductor badly injured.

26th, 3 a. m., on Buffalo, Rochester & Pittsburgh, near

Beech Tree, Pa., a freight train with a pushing engine broke in two at the summit where the pushing engine was to be detached. The forward portion ran forward, and the break-in-two having been discovered, the cars were set on a siding and the engine returned for the rear portion. The rear portion was not held at the summit, and it ran down some distance to a sharp curve, where it met the engine, badly damaging several cars and the engine and killing the engineer and a brakeman.

27th, on Burlington & Missouri River, near Robb, Col., an eastbound freight train which had stopped to cool a hot box, was run into at the rear by a following stock train, wrecking engine and 13 cars of stock and merchandise. A passenger in the caboose of the foremost train was killed and another badly injured. It is said that torpedo signals had been properly placed to stop the following train. The engineer and fireman were badly injured.

28th, on Chicago, Burlington & Quincy, near Creston, Ia., a freight train which had been derailed was run into at the rear by another freight, wrecking engine and 7 cars. Three trainmen were injured.

28th, 2 a. m., on Philadelphia & Reading, at Reading, Pa., an empty engine standing behind a passenger train, which was made up to go to Philadelphia, was boarded by an insane man with a revolver, who drove off the fireman and started the engine forward. Two employes boarded the engine after it started, but were driven off. The passenger train was pushed some distance, but finally became stalled, the brakes being on; the man then jumped off and eluded the police, who arrived just then.

28th, on Covington & Macon, near Monticello, Ga., the third section of a circus train became uncontrollable in descending a grade and ran into the rear of a second section, killing one and injuring two circus men and killing a fireman.

28th, 10 p. m., on Rome, Watertown & Ogdensburg, near Watertown, N. Y., passenger train ran over a misplaced switch and into an engine standing on a gravel track. An engineer and another trainman were injured and three passengers slightly hurt.

28th, 8 p. m., on New York, Chicago & St. Louis, near Irving, N. Y., a fruit train descending a grade broke in two and the rear portion afterward ran into the forward one, wrecking eight cars. The forward portion of the train had been slackened on account of the bridge.

30th, on Cincinnati, New Orleans & Texas Pacific, at Tunnel No. 26, a freight train which had stopped was run into at the rear by a following freight, wrecking the caboose and several cars. Several trainmen injured.

31st, on East Tennessee, Virginia & Georgia, at Steele's Mill, Ga., a southbound freight train ran over a misplaced switch and into 5 cars standing on the side track, making a bad wreck. Engineer and brakeman killed.

And 31 others, on 23 roads, involving 5 passenger trains and 50 freight and other trains.

BUTTING.

2d, on Cincinnati, Wabash & Michigan, at Linwood, Ind., a passenger train ran into the head of a freight backing into a siding, badly damaging both locomotives, baggage car and forward coach. Conductor and 2 passengers injured.

4th, on Northern Pacific, at Mullan, Mont., a passenger train ran over a misplaced switch and collided with an engine standing on a siding, damaging engines and a mail car. Engineer killed and fireman badly injured.

4th, on Buffalo, Rochester & Pittsburgh, at Rochester, N. Y., collision between freight trains, damaging both engines and 2 cars. Engineer seriously injured.

5th, on Georgia Pacific, at Oxmoor, Ala., a locomotive standing on a siding leaked steam and started unintended for the main track, where it collided with a passenger train. Both engines and several cars badly damaged. Fireman killed and 3 other trainmen injured.

8th, on Pittsburgh, Cincinnati, Chicago & St. Louis, at Frazeysburg, O., butting collision between two freight trains, badly damaging the engines and a dozen cars. It is said that one of the trains encroached 2 minutes upon the time of the other.

9th, on East Tennessee, Virginia & Georgia, at Rome, Ga., butting collision between a freight train and a switching engine, wrecking both locomotives and damaging about a dozen cars. A trainman was injured by jumping.

11th, on East Tennessee, Virginia & Georgia, near Citico, Tenn., butting collision between a passenger train and a freight on a curve. The front ends of both engines were damaged and several cars in each train derailed. Two passengers injured.

11th, 8 a. m., on St. Louis Bridge & Tunnel road, at St. Louis, Mo., butting collision between two freights in the tunnel, damaging both engines and several cars. Two trainmen riding on the cowcatcher of one of the locomotives were killed.

12th, night, at Como Station, Minn., butting collision between Great Northern and Chicago, St. Paul, Minneapolis & Omaha freight trains running at speed, piling up the forward portion of each train in a very bad wreck and killing 50 head of cattle. Fireman killed and 4 other trainmen and a drover injured.

12th, on Minneapolis, Lyndale & Minnetonka, near Lake City, Minn., collision between a freight train and a light engine, disabling both engines and damaging 3 stock cars, killing a dozen head of cattle. Two trainmen injured. The accident is attributed to the freight conductor's watch being 4 minutes slow.

13th, on Cleveland, Akron & Columbus, at Hudson, O., butting collision between a freight train, the engine of which had run short of fuel, and a locomotive which had been sent out to assist it. Both locomotives and several cars derailed and damaged. Two cars containing oil, which were thrown over an embankment, took fire and were destroyed. An adjacent dwelling also caught fire and was partially consumed.

14th, on Baltimore & Ohio, near Zanesville, O., butting collision between two freight trains, making a very bad wreck. Three trainmen and a tramp killed and 2 trainmen injured.

15th, on Lehigh Valley, near Ashland, Pa., butting collision between two freights, due to a misunderstanding of orders. Both engines and 20 cars were badly damaged and 4 trainmen injured.

15th, on Lehigh Valley, at Centralia, Pa., butting collision between two freight trains, piling up both engines and a number of cars in a pretty bad wreck. Four trainmen injured.

16th, on Pittsburgh & Lake Erie, near Rankin, Pa., butting collision between freight trains. Both engines and about 20 cars were badly damaged and 2 trainmen slightly injured.

18th, on Pennsylvania, near Frankford, Pa., butting collision between a freight train and a switching freight, due to a mistake in signaling, wrecking both engines and 4 cars. Engineer and fireman badly injured.

19th, on Baltimore & Ohio, near Cameron, W. Va., butting collision between freight trains, piling up both engines and 13 cars loaded with grain in a bad wreck. Brakeman killed.

21st, 10:30 p. m., on Kansas City, Memphis & Birmingham, near Ensley, Ala., collision between a passenger train moving backward and an empty engine, badly damaging a number of coaches, killing 1 passenger and 1 employe, and injuring 28 passengers. The runner of the passenger train assumed that he had received the conductor's all right signal when he had not, and pulled out of Birmingham before his train was fully made up. He discovered his error at Ensley (the conductor not being abor'd) and had started to set back to Birmingham.

21st, on Buffalo, Rochester & Pittsburgh, near Machias, N. Y., butting collision on a curve between a southbound passenger train and a freight, damaging both engines. Four trainmen and 5 passengers injured. The freight was running on the other train's time.

21st, on Elgin, Joliet & Eastern, at Joliet, Ill., butting collision between a freight train and a construction train just pulling out of the yard. The locomotives, taking a rampant attitude, were thrown over a 30-ft. embankment and, together with a number of cars, badly wrecked. Several cars of the freight train became detached and ran down grade and off the end of a spur track. Fireman killed and 8 employes injured. It is said that but for a lack of sand on the engine, one of the trains would have stopped in season to avert the collision.

22d, 4:40 a. m., on Cincinnati Southern, near Sloans Valley, Ky., butting collision in a tunnel between a southbound passenger train and a freight, badly wrecking the forward portion of each train. The wreck took fire and most of it was burned up. The three rear sleepers were detached and saved. The crew of the freight, which was to meet two passenger trains at the above named station, having fallen asleep and being awakened by the passage of the first passenger train, started out under the impression that the second train had passed. Seven employes were killed and 5 employes and 5 passengers were injured.

23d, on Union Pacific, near Silver Bow, Mont., butting collision between a passenger train and a freight, killing a fireman and injuring another trainman.

23d, on Union Pacific, near Clarnie, Or., butting collision between freight train 21 westbound and second 22 eastbound, wrecking both engines and several freight cars. An engineer was killed and a fireman injured. A coroner's jury found that 21 ran upon the time of second 22 because first 22 ran without signal lights on the engine to indicate that another train was to follow. The fireman was blamed for the lights going out, and the engineer censured for not seeing that they were kept burning. The engineer claims, however, that one light was burning and that he gave the whistle signal warning the other train to look for lights.

23d, on Northern Pacific, near Ellensburg, Wash., butting collision between two freights, due to misinterpretation of orders, making a pretty bad wreck. Two trainmen killed.

23d, on Union Pacific, near Buxton, Mont., butting collision on a curve between a passenger train and a helper engine descending a grade. Both engines were badly damaged, killing a fireman and injuring a brakeman. The watch of the engineer of the latter was 8 minutes slow.

23d, 2 p. m., on Northern Pacific, near Weston, Wash., butting collision between a freight and a work train, killing 2 laborers and injuring a number of others. Each crew claims that the other was negligent.

24th, on Roanoke & Tar River, near Lewiston, N. C., butting collision between a log train and a gravel train, injuring several trainmen.

24th, on Cincinnati, Hamilton & Dayton, near Oxford, O., butting collision of freight trains, making a very bad wreck. One of the trains had a helping engine behind it and nearly every car in the train was destroyed, a large portion of the wreck being burned up. One trainman killed and 6 injured. It is said that a mistake in telegraphic orders was the cause.

24th, on Central New England & Western, at Salisbury, Conn., butting collision between two freight trains, wrecking both engines and 7 cars. Most of the wreck was burned up, and a brakeman was killed.

25th, night, on Michigan Central, in Grand Rapids, Mich., butting collision between a switch engine with empty passenger cars and a switching freight of the Chicago & West Michigan, badly damaging two cars.

25th, on Baltimore & Ohio, at Moundsville, W. Va., a special passenger train standing in the yard was run in to at the front end by a regular passenger train, badly damaging both engines and pushing the special back into the front of another passenger train standing behind it. An engineer was injured.

25th, on Philadelphia & Reading, near Warwick, Pa., southbound express train ran into 3 loaded coal cars standing on the main track, wrecking the coal cars, overturning the engine and damaging the smoking car next to it. Two men on one of the coal cars were killed and 2 others were injured. The engineer and fireman and 5 passengers were also injured. The coal cars were accidentally pushed upon the main track by reason of a misplaced switch in a siding on which they were being moved.

26th, 1 a. m., on Illinois Central, near Dubuque, Ia., an eastbound passenger train ran into a switching engine which was moving west on the main track. One engineer and several passengers were injured and both engines were badly damaged.

27th, on New York Central & Hudson River, near Cohoes, N. Y., butting collision between a passenger train and a freight, wrecking both engines, 3 freight cars and a baggage car. A passenger was injured.

29th, night, on Southern Pacific, at Painted Cave, Tex., butting collision between a freight and a construction train, wrecking engines and several cars. The foreman of the construction train was killed.

30th, on Iowa Central, near Marshalltown, Ia., butting collision between a freight and switching engine, making a very bad wreck; both engineers and both firemen injured by jumping. It is said that a train dispatcher's mistake was the cause of the collision.

30th, on Georgia Pacific, near Days Gap, Ala., butting collision between westbound freight No. 16 and third 23 eastbound. It is said that the crew of the former train had forgotten a meeting order. The wreck was a bad one, and one engineer and one fireman were injured.

And 12 others, on 12 roads, involving two passenger and 22 freight and other trains.

CROSSING AND MISCELLANEOUS.

1st, on Central New England & Western, at Copake, N. Y., collision between passenger trains, damaging both engines and several cars. Conductor and several passengers injured.

1st, on New York Central & Hudson River, at Manhattanville, N. Y., a collision between a passenger train and a switch engine at a crossover track, disabling both engines and injuring 2 passengers riding on the front platform of the forward passenger car.

2d, on Philadelphia & Reading, at West End, Pa., a passenger train carrying miners collided with a freight train entering a side track, damaging both engines. Several employes and a tramp injured.

2d, on Terre Haute & Indianapolis, at Collinsville, Ill., collision between a passenger train and a switching freight entering a siding, owing to the runner of the latter passing a danger signal. Engineer killed and fireman slightly injured.

3d, on Lake Shore & Michigan Southern, in Detroit, Mich., several cars of a construction train were derailed and badly damaged by cars projecting over the main track from a siding. A number of employes were injured in jumping.

9th, at the crossing at West End, Minn., the rear car of a Northern Pacific passenger train was struck and overturned by a St. Paul & Duluth freight train which approached the crossing uncontrolled. The passenger car took fire, but the flames were soon subdued. The engine of the colliding train was not derailed, but the trucks of the tender broke down, and the two following cars were piled on top of it. Four passengers injured.

11th, on Pennsylvania road, near Cresson, Pa., collision between three freight trains in which two locomotives and about twenty cars were piled up in a bad wreck; one brakeman killed and another injured.

11th, on Kansas City, St. Joseph & Council Bluffs, at Pacific Junction, Ia., a yard engine was derailed by a misplaced switch and struck by an incoming freight train, damaging both engines and killing an engineer.

16th, on New York Central & Hudson River, in Rome, N. Y., a switch connecting the main tracks was disarranged by a log, one end of which had slipped off a platform car in an eastbound freight and was dragged along the ground. The following car was derailed and collided with the engine of an opposite bound freight, which, together with a number of cars, was derailed and badly damaged.

19th, on Pittsburgh, Cincinnati & St. Louis, in Columbus O., several cars of a switching freight got away from the trainmen and collided with a standing caboose, wrecking it and killing two trainmen asleep therein.

21st, on Toledo, St. Louis & Kansas City, at Bingham, Ill., a gravel train was run into by another train, injuring several workmen.

31st, on Northern Pacific, in Tacoma, Wash., a passenger train which had just started from the station was run into by a switching engine. The engineer of the latter reversed and jumped off and the engine ran backward some distance where it collided with a work train, wrecking several platform cars. Two trainmen were injured.

And 22 others, on 19 roads, involving 11 passenger and 33 freight and other trains.

DERAILMENTS.

DEFECTS OF ROAD.

2d, on Union Pacific, near Draper, Utah, 6 cars of a passenger train were derailed by a defective fish plate, several of them being thrown over on their sides, injuring 3 passengers.

3d, on Wabash road, in East St. Louis, Ill., a passenger train was thrown from the track by the spreading of the rails. The engine and tender were thrown against a locomotive standing on an adjoining track, badly damaging both.

12th, on Union Pacific, at Red Desert, Wyo., a freight train was derailed by a broken switch, the rear portion of the train and the station building being badly wrecked. A sectionman was caught by a toppling car and killed. A number of valuable horses were killed and maimed.

14th, on Illinois Central, at Mounds, Ill., passenger train derailed by a defective switch, the train being badly damaged. Engineer and fireman injured.

15th, on Northern Pacific, near Helena, Mont., a high bridge gave way under a freight train, the entire train going down with it. Five trainmen injured.

20th, on Chicago & Eastern Illinois, near Watseka, Ind., passenger train derailed by a broken rail, two cars being thrown over on their sides, injuring conductor and several passengers.

21st, on Illinois Central, in North Carbondale, Ill., freight train derailed by a defective frog, the engine and 10 cars being piled up in a bad wreck. Brakeman killed, engineer and fireman injured.

24th, on Illinois Central, at Centre Grove, Ill., freight train No. 7, while passing over a wooden trestle bridge at which workmen were erecting a steel bridge, was partially wrecked, the east end of the bridge giving way under the ninth car. Six cars were piled up in the ravine, and the water-boy of the bridge gang was killed. Five of the bridge men were injured.

26th, on St. Louis, Iron Mountain & Southern, at Barlow, Mo., passenger train No. 755 derailed by a broken rail, making a bad wreck and killing 1 passenger.

27th, on Chicago, Milwaukee & St. Paul, at Portage, Wis., passenger train moving slowly derailed by the cowcatcher catching on a broken guard rail. The engine was overturned and the mail car was piled upon it. The fireman was injured.

30th, on St. Louis, Vandalia & Terre Haute, at Hagers-town, Ill., passenger train No. 12, running 35 miles an hour, derailed by a defective frog. It is said that no one was injured.

And 4 others, 2 passenger and 2 freight trains, on 4 roads.

DEFECTS OF EQUIPMENT.

1st, on Eureka & Palisade road, near Palisade, Nev., 6 cars of a freight train derailed by a broken axle and ditched. A tramp stealing a ride was injured.

1st, on Pennsylvania, near Donohoe, Pa., 6 cars of a coal train descending a grade were derailed and wrecked by the breaking of an axle. Part of the wreckage was thrown in front of a freight passing on the opposite bound track, and the engine and about a dozen cars were added to the wreck, blocking both main tracks for some time. Several trainmen slightly injured.

3d, on Cincinnati Southern, near Roddy, Tenn., a car of a freight train broke down and 9 cars were derailed and ditched. Brakeman badly injured.

5th, on Newport News & Mississippi Valley, near Olympia, Ky., Pullman car of passenger train derailed by the breaking of an axle and ditched, injuring about 20 passengers.

8th, on Pittsburgh, Virginia & Charleston, in Pittsburgh, Pa., a number of cars in a switching freight train were derailed by a broken truck. A box car loaded with ice and 2 flat cars containing steel billets were overturned and with their contents thrown over a high wall 50 ft. into the street below, the blocks of ice in the former breaking through the roof of the car. A brakeman was killed.

11th, on Peoria, Decatur & Evansville, near Pekin, Ill., forward driving wheel of engine of passenger train broke while running at speed, tearing away the air brake apparatus on the locomotive and derailling the rear truck of the hindmost car. The train ran about a mile before coming to a standstill. Fireman badly injured by jumping.

15th, on Chicago & Eastern Illinois, near Cayuga, Ind., 10 cars of a freight train were derailed and badly wrecked by the breaking of a wheel. Brakeman killed.

16th, on East Tennessee, Virginia & Georgia, near Braswell, Ga., passenger train derailed by a broken wheel. Four trainmen and one passenger injured.

28th, on Richmond & Danville, near Seneca, S. C., 2 Pullman cars in a passenger train were derailed by the breaking of a flange. The cars were overturned and thrown down a bank and 6 passengers were injured.

And 13 others, all freight trains, on 9 roads.

NEGLIGENCE IN OPERATING.

3d, on Union Pacific, at Rock Creek, Wyo., engine and 6 cars of a passenger train were derailed by a misplaced switch and ditched. Engineer, fireman and a passenger injured.

3d, on Louisville, New Albany & Chicago, at Battle Ground, Ind., a passenger train was derailed by a misplaced switch, the engine and forward cars going over an embankment. Engineer fatally injured.

9th, 3:30 a. m., on Union Pacific, at Rock Creek, Wyo., an eastbound passenger train, drawn by two engines, ran over a misplaced switch, and the forward portion was derailed and badly damaged. Burning coals from the firebox of the rear engine ignited the forward end of the baggage car, but the flames were soon extinguished. Engineer, fireman, and a porter were injured.

12th, on Newport News & Mississippi Valley, at St. Charles, Ky., a passenger train ran into a hand car loaded with rails, wrecking the engine and killing the engineer.

17th, on Cleveland, Cincinnati, Chicago & St. Louis, in Cincinnati, O., in making a flying switch two flat cars loaded with machinery were derailed and were thrown against an adjacent building, doing considerable damage and killing a man walking near the tracks.

25th, on Union Pacific, near Cheyenne Wells, Col., 13 cars of a freight train derailed by a steer which had broken out of a car through the end door and fallen upon the track.

And 7 others, 3 passenger and 4 freight trains, on 7 roads.

UNFORESEEN OBSTRUCTIONS.

1st, on Milwaukee & Northern, near Menasha, Wis., an accommodation train ran over a horse, derailling the engine and injuring three trainmen.

4th, on East Tennessee, Virginia & Georgia, near McPherson, Ga., a freight train ran into a mass of earth which had been dislodged by heavy rains at the mouth of a tunnel and fallen upon the roadbed. The entire train was pretty badly wrecked, the engineer and fireman receiving fatal injuries.

6th, on Union Pacific, near Celilo, Or., a passenger train was derailed by sand which had drifted upon the track, wrecking the engine. Fireman killed, and the engineer and a man riding on the engine injured.

9th, on Pennsylvania, near Curtin, Pa., a passenger train ran over a cow, derailling engine, tender and one car. Fireman injured by jumping.

12th, on Sioux City & Pacific, near Whiting, Ia., passenger train derailed at a point where the roadbed had been impaired by a freshet. One passenger injured.

18th, on Ft. Wayne, Cincinnati & Louisville, near Rushville, Ind., a northbound passenger train ran into a tree which had been blown down across the track, derailling engine and baggage car. Fireman seriously injured.

19th, on Ohio River road, near Parkersburg, W. Va., freight train ran into a landslide, wrecking engine and 5 cars. Engineer and conductor severely injured.

21st, on Chicago, Milwaukee & St. Paul, near Excelsior Springs, Mo., a freight train was thrown from the track and partially wrecked, at a point where rail fastenings had been maliciously removed. Fireman killed and a brakeman badly injured.

22d, on Atlantic & Pacific, near Ash Fork, Arizona, a passenger train ran over some cattle, the entire train, except the sleeper, being derailed. Two trainmen injured.

23d, on Chesapeake & Ohio, near Hinton, W. Va., a passenger train was derailed by a rock which had rolled down upon the track, the engine and express cars being derailed and damaged. Engineer and 2 trainmen injured. A watchman had passed over the spot a few minutes before and found the track clear.

24th, on Central of New Jersey, near Honeyport, Pa., 18 cars of a coal train were derailed at a washout and thrown into the Susquehanna River. Two trainmen slightly injured.

31st, on Gulf, Colorado & Santa Fé, in Galveston, Tex., switching engine derailed by running into a wagon and overturned into the Bay. A child in the wagon was killed.

And 3 others, 1 passenger and 2 freight trains on 3 roads.

UNEXPLAINED.

3d, on Jeffersonville, Madison & Indianapolis, near Jeffersonville, Ind., a car of a freight train was derailed and dragged a distance of 4 miles before the accident was discovered, clipping off the heads of many of the spikes on one side of the track.

3d, on Georgia Pacific, on a bridge over Little Warrior River, in Alabama, a freight train was derailed and 3 cars thrown into the stream, fatally injuring a brakeman.

4th, on West Virginia & Pittsburgh, near Seymour, W. Va., 2 cars of freight train derailed and damaged, injuring a brakeman.

6th, on Peoria & Pekin Union, at Peoria, Ill., car of a switching freight train derailed, injuring a brakeman.

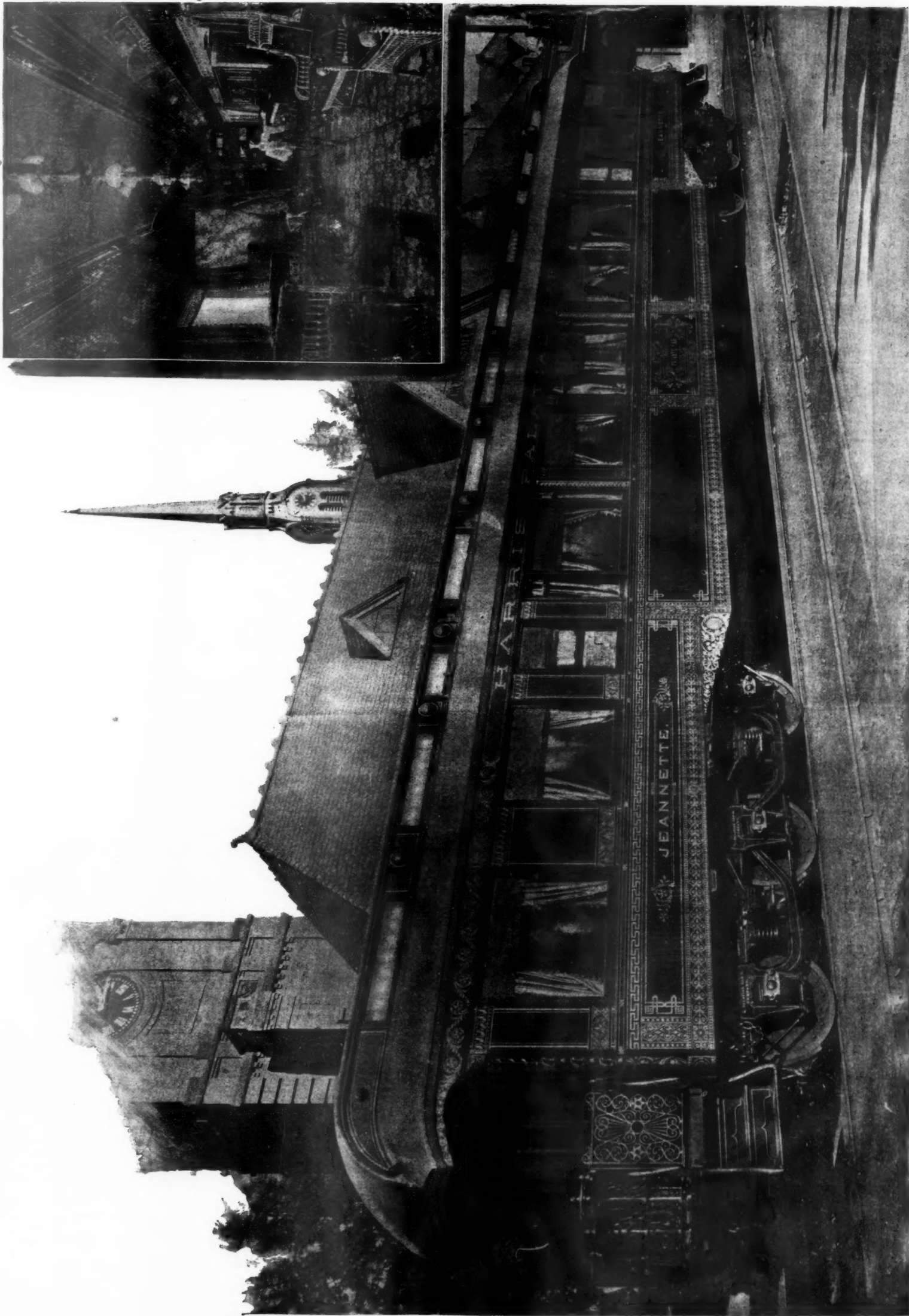
8th, on Georgia Southern & Florida, near Jasper, Fla., 4 cars and caboose of freight train derailed and overturned. A passenger riding in the caboose was killed and 3 other passengers and 2 trainmen were injured.

7th, on Denver & Rio Grande, near Sargent, Col., passenger train derailed at a curve, 4 sleeping cars being thrown over on their sides. A passenger riding on the platform of the tourist car was killed and 10 passengers and a Pullman conductor were injured.

7th, on Louisville Southern, near Lexington, Ky., engine and 5 cars of freight train derailed and partially wrecked. Engineer killed and fireman injured.

8th, on Central Pacific, near Terrace, Utah, engine and 6 cars of freight train derailed and ditched. One employe killed and another injured.

10th, on Augusta, Gibson & Sandersville, at Wren's, Ga., 2 passenger and 4 freight cars of mixed train derailed, injuring a trainman.



HARRIS EXCURSION CAR "JEANNETTE."
Built by the HARRIS PALATIAL CAR COMPANY at the shops of the WASON MANUFACTURING COMPANY.

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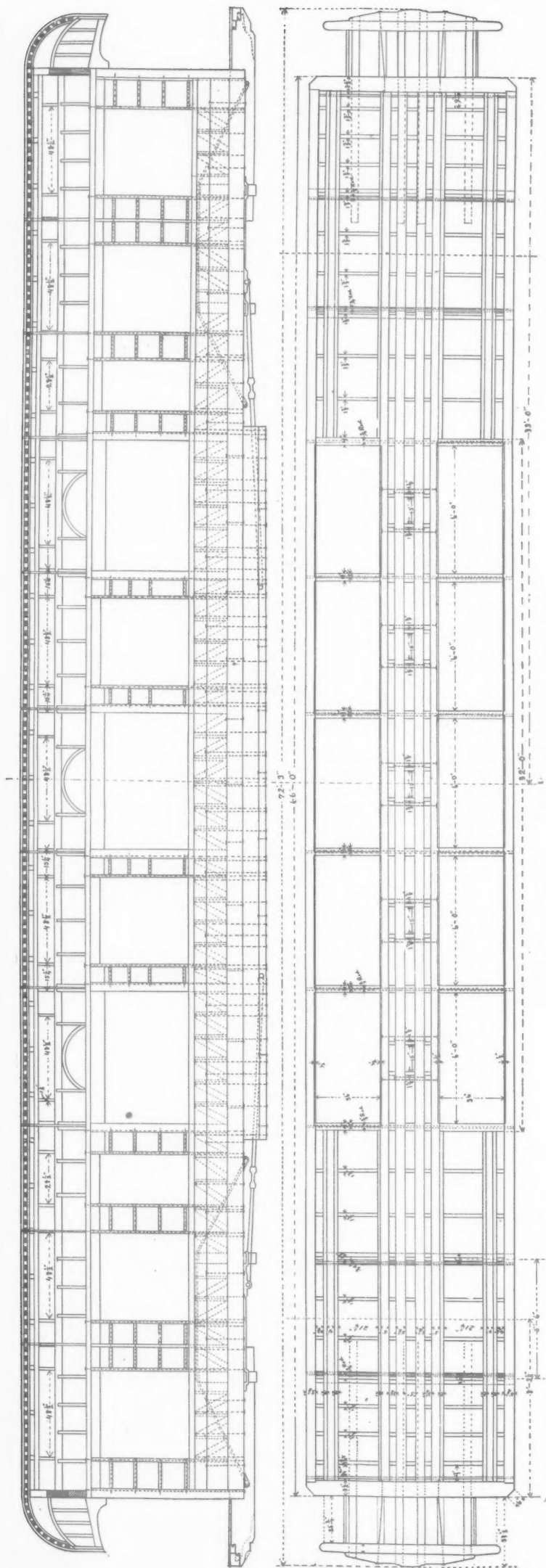
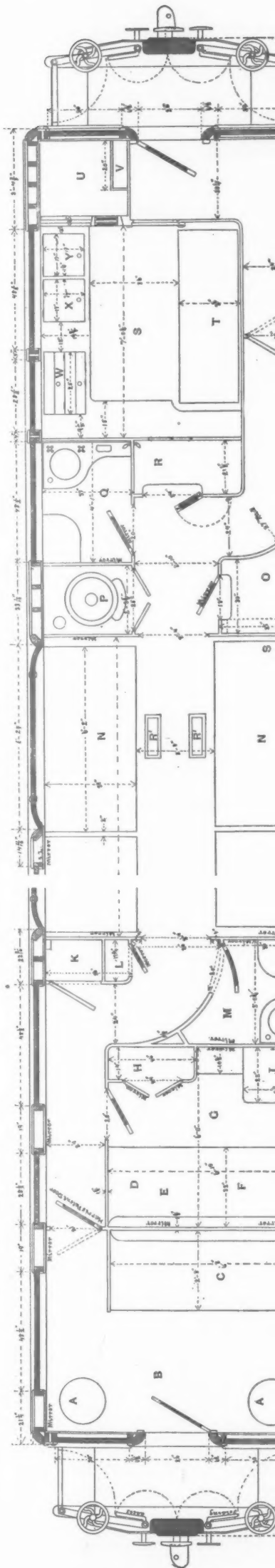


Fig. 1, Side Elevation, and Fig. 2, Plan Showing Floor Framing.



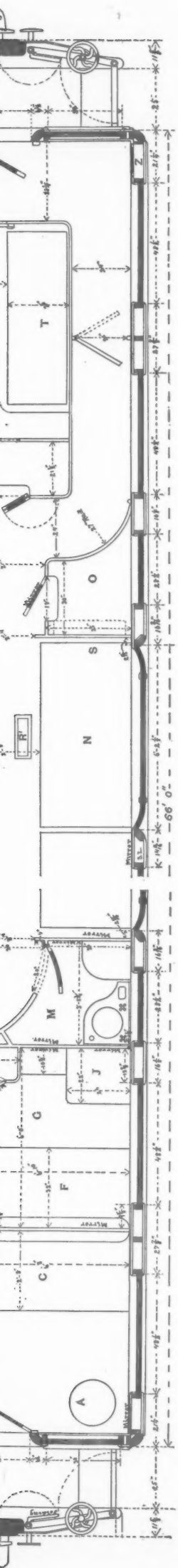


Fig. 3—Floor Plan Showing Arrangement of Rooms.

Letters in the diagram mean: A, chairs opposite windows of observation room; B, table; C, sofa, convertible into berths at night; D, desk; E, sink; F, stove; G, bed; H, closet; I, sink; J, closet for glass, and beneath it is a wine locker.

a safe for valuables, and M the ladies' lavatory. N, N' show the location of the berths, which are 6 ft. 2 in. long. The clearances are five sections on each side of the car. The drawing into smaller compass R indicates location of registers for admitting warmed air from the steam pipes, which run lengthwise beneath the floor next to the I-beams, as shown in fig. 4. There is a register opposite each berth, and the occupant of each has therefore more or less control over the heat for his particular compartment. By arranging the

curtain of his berth so that it will hang outside the register he can appropriate a large share of the heat to himself. O is a porter's closet, and P the steam heater. Q is a gentlemen's lavatory, and R a pantry with china and linen departments. S is a writing desk which shuts into the space beneath which the space is needed for the berth. S is the kitchen, and T the range with hot water tanks above and fuel closets beneath. U is the refrigerator and ice chest, V the air flue, W the sink, X receptacle for vegetables, and Y one for fish. W, X and Y are

fixed in a brass top table, above which is a berth for the cook. Z is a tool closet, and in the corner adjacent is a drop seat for the porter. Referring to the space at the left of berth N, S, L indicates a space occupied by a silver locker. There is one of these for each section, containing the table silver used when the compartment is fitted up as a dining room. The windows, as shown in fig. 4, are of double glass, 4 1/2 in. x 36 in., and the main window is of double beveled glass, consisting of upper and lower sashes, the upper one being adjustable at will by the occupant of the upper berth.

HARRIS EXCURSION CAR "JEANNETTE."

16th, on Cornwall road, near Miner's Village, Pa., 10 cars of an ore train derailed and damaged, injuring 2 brakemen.

17th, on Cincinnati, Wabash & Michigan, near Sodus, Ind., freight train derailed, the engine and several cars going over a high embankment, slightly injuring engineer and fireman.

20th, on Northern Pacific, near Hopper's, Mont., a freight train derailed on a descending grade, badly wrecking engine and about 20 cars. Engineer killed, brakeman injured.

20th, on Georgia Pacific, near Cook Springs, Ala., freight train derailed and 10 loaded cars wrecked, killing a brakeman.

21st, on St. Louis & San Francisco, near Conway, Mo., freight train derailed and 18 cars badly wrecked. A tramp was killed.

24th, on Atchison, Topeka & Santa Fe, near Wakarusa, Kan., passenger train derailed at a curve, 3 of the cars being overturned. Thirty passengers injured.

28th, on South Florida road, near Orlando, Fla., passenger train derailed; fireman killed and engineer injured.

29th, on Gulf, Colorado & Santa Fe, near Wylie, Tex., 5 cars of a freight train derailed and wrecked; one trainman injured.

29th, 1 a. m., on Northern Pacific, near North Yakima, Wash., passenger train derailed, injuring 2 passengers and an express messenger.

And 32 others, 7 passenger and 25 freight trains, on 27 roads.

OTHER ACCIDENTS.

13d, on Chicago, Burlington & Quincy, at Kewanee, Ill., as a passenger train and a freight train were passing on adjoining tracks a number of windows in the former were broken by a loose freight car door, injuring several passengers, one of them perhaps fatally.

8th, on Rome, Watertown & Ogdensburg, at Mexico, N. Y., boiler of engine of freight train standing at the station exploded, the crown sheet blowing out. Fireman killed and 2 other trainmen injured.

11th, on Chicago & Erie, near Huntington, Ind., engine sent out to assist a disabled freight exploded its boiler, seriously injuring engineer and fireman.

16th, on Baltimore & Ohio, near Washington, D. C., locomotive of passenger train blew out her crown sheet, seriously injuring the fireman.

19th, on Lake Shore & Michigan Southern, near Silver Creek, N. Y., westbound passenger train No. 5 moving at high speed ran into some wreckage which had been thrown over from the adjoining track in a collision between 2 eastbound freights, badly damaging the locomotive and crushing in the sides of 3 coaches. Engineer and 4 passengers injured.

20th, on Monongahela Connecting road, in Pittsburgh, Pa., a switch engine pushing a string of freight cars exploded its boiler, the boiler being split almost the entire length. Engineer and fireman killed and conductor and a brakeman badly injured. Three men working in an adjacent building were also injured by flying debris.

27th, on Gulf, Colorado & Santa Fe, near Miles, Tex., a car of household goods in a freight train was discovered to be on fire, and the train was stopped and backed toward the nearest station, but before it reached there 2 cars containing, among other things, 9 horses were consumed.

29th, on Brooklyn Union Elevated road, at Grand and Myrtle avenues, Brooklyn, N. Y., a passenger train ran over a misplaced switch and into the buffer blocks at the end of the track, damaging engine and several cars.

29th, night, on New York, Providence & Boston, at Valley Falls, R. I., 2 steel bridge girders loaded on platform cars in a freight train became displaced and swung around so as to break through the sides of 2 cars in a passenger train just passing. Three passengers were killed and 7 passengers and 1 employe injured.

And 7 others, 6 passenger trains and 1 freight, on 6 roads.

A summary will be found in another column.

A Novel Form of Flexible Tubing.*

It seemed to me at first rather a wild kind of an idea to make a metallic tube which would be quite flexible, and which could be used for conveying illuminating gas. I have, however, after many experiments, succeeded not only in making a flexible tube for such purposes, but also one which will convey gases, steam, or liquids under considerable pressure. This tube has sufficient

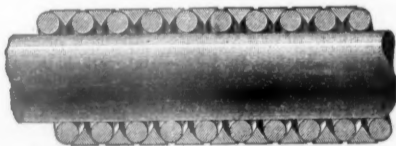


Fig. 1.—Tube before Mandrel is withdrawn.

flexibility for all practical purposes, with the additional advantages of great strength and durability.

When a tube is formed by coiling a wire around a mandrel, the convolutions may be made to press upon each other with considerable force, and the joint formed at the point of contact of the individual convolutions will be tight in proportion to the amount of pressure exerted. If such a tube be bent the joints will be broken all around the coils except at one point, and therefore, when bent, it is useless for conveying liquids or gases.

Wishing to utilize the peculiar flexibility of spiral spring tubing for the conveyance of gases in cases where a flexible tube is required, I conceived the idea of interposing a triangular-shaped wire between the coils of a round wire, as shown by fig. 1. When a tube so constructed is bent the convolutions of the triangular coil adjust themselves to the spaces between the round coils, as shown in fig. 2. The triangular wire is pressed between the coils of the round wire, during the process of constructing the tube, with sufficient force to spread them apart, so that the contact surfaces are at all times under pressure. The triangular wire serves two purposes: one is to spread the coils apart, so that the press-

ure will be exerted on the contact surfaces; the other to fill the irregularly shaped spaces between the coils of round wire, adjusting itself to the changing form of the

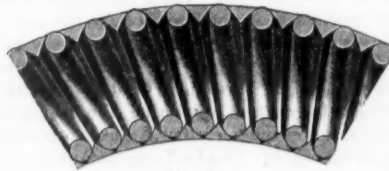


Fig. 2.

spaces due to any given flexion. This pressure brings into play the element of friction to such an extent as partly to destroy the flexibility of the tube, which, when bent, will retain the form given to it. This was an unlooked for and unexpected quality. As the primary object was to obtain a flexible tube trials were made with wire having a more obtuse angle. This gave better results, as a more perfect joint was produced with less tension of the inner coil, and the friction became correspondingly less, the result being a tight tube with sufficient flexibility.

Fig. 3 shows the shape of the seats into which the round wires are forced by their tension. Reference to fig. 1 will show that the seat for the inner wire is much more obtuse, and on this account the inner wire will not, under a given tension, be forced into such a seat so tightly as in the sharper V in fig. 3. It will be seen that the degree of flexibility depends upon the amount of tension put upon the inner coil, or the extent to which the convolutions are forced apart. I have produced a perfectly tight tube with two coils of round wire, in which the outer coil is wound sufficiently tight between the convolutions of the inner coil to spread them apart for the purpose of getting pressure on the joints, substantially the same as with the triangular wire. This makes a

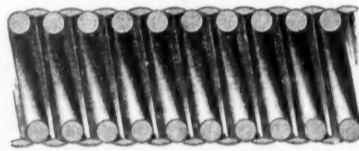


Fig. 3.

very strong tube, but is too bulky for many purposes. Two half-round wires, or even less than half-round, may be used; or the inner wire may be round and the outer half-round, or much less than half-round. The tube will then be less bulky, and, supposing the outer wire to be considerably less than half-round, the convexity of its surface may be such as to give results similar to the obtuse triangular wire. I have made several tubes in which the contact surfaces of the coils are made to coincide with a circle whose centre is the axis of the tube. The joints so formed are practically a series of ball and socket joints; such a tube has smoother outer and inner surfaces than those previously described. A serious objection to such a tube is that the wire changes its shape during the process of coiling, so that the joint surfaces will not make sufficiently complete contact, whereas the forms of wire previously mentioned are of simple construction, and the slight change of form which occurs during the process of coiling will not effect the result.

The extent to which this tubing may be bent without leakage is considerable. I have not yet made any tube larger than $\frac{5}{16}$ -in. bore, but I think it possible to make them as large as 1 in. bore, and strong enough to stand any ordinary steam pressure.

Notes by the Way.

The 20 new 10-wheeled engines built by the Baldwin Locomotive Works for the Missouri Pacific will prove a material assistance to Mr. Frank Reardon, the newly appointed Superintendent of Motive Power. Ten of these engines have 20 x 24-in. cylinders and 55-in. driving wheels, the balance having 19 x 24-in. cylinders with 62-in. wheels. In working order these engines weigh about 117,000 lbs., of which 89,500 is on the drivers. The smallest inside diameter of the boiler shells is 60 in. and they have 236 two-inch flues.

A fine new 25-stall brick engine house has recently been completed at Baring Cross, on the Arkansas division of the Iron Mountain Railway. This building is 70 ft. in the clear between the walls and has an iron roof covered with slate.

Upon this division of the Missouri Pacific system the average number of miles run per ton of coal for the whole number of engines in service is from 38 to 40, or about 55 miles for passenger and 35 miles for freight engines. The average monthly mileage of engines in service is about 4,700 and, including all engines, 3,900 miles. The coal used has the peculiarity of forming a cake of clinker-like material upon the crown and tube sheets, its removal being necessary at the end of each trip. Some particles of this slag find their way through the flues and form horizontal stalagmites in the front ends, the bases of the cones being firmly attached to the deflectors. This peculiarity of the coal prevents the

use of the brick arch, which would grow too rapidly in dimensions from the constant accumulation of slag. What with bad water and coal as above described, the master mechanic in this section of the country has more than the average of difficulties to contend with.

C. B.

Hydraulic Machinery at St. Lazare Station, Paris.

In February and March, 1886, the *Revue Générale des Chemins de Fer* published an account of the proposed arrangement of the hydraulic machinery, etc., for the recently built freight house at the St. Lazare station, Paris. Since then the extension of the passenger station and other improvements have led to the installation of new hydraulic apparatus, a third pumping engine, two new steam boilers and an increase in the system of water pipes. In the July, 1890, number of that journal these improvements are described in detail, together with drawings and plans of the house and details of the devices. The importance of these improvements is well shown by the following list of machinery, etc.: Three pumping engines of 50 horse power each; four steam boilers, two elevators of 16 tons capacity, nine smaller elevators, seven combined transfer and turntables, 22 capstans, two inclined planes, six accumulators and 14,540 ft. of supply and return water pipes, not including small branches.

The pumping engines are of the compound horizontal type, fitted with Meyer expansion gear and speed regulators. They are non-condensing on account of the high price of the city water, and because of the great expense of boring a well. The principal dimensions of these engines are as follows:

Diameter of high-pressure cylinder.....	14.17 in.
low-pressure ".....	24 in.
Stroke of pistons.....	23.6 in.
Revolutions per minute.....	40 to 50
Horse power, in water lifted.....	39.4 to 49.3
Coal (Newcastle) per horse power per hour.....	3.3 lbs.
Water pressure per square inch.....	745 lbs.
Diameter of water pistons.....	2.76 in.
Stroke of water pistons.....	23.6 in.

The pumps ordinarily draw water from one of two rectangular reservoirs of 618 cu. ft. capacity. The upper level of these reservoirs is about 23 ft. above that of the foot valves of the pumps and from 6.5 to 9.8 ft. below the level of the discharge pipes of the capstans and cranes, which are placed on the upper floor of the freight house. The reservoirs are fed by the water discharged from the hydraulic hoisting machinery, and by the city water when necessary to make good the losses from joints in pipes, etc., which are found to be less than 35.3 cu. ft. in 24 hours.

The steam boilers are of the horizontal type, with Berendorff tubes. The steam pressure is 128 lbs. per square inch. Two accumulators are placed in a room adjoining the engine room and the speed of the pumping engine is regulated by them. Each accumulator consists of a vertical fixed cylinder in which works a plunger 16.9 in. in diameter and having a stroke of 17 ft. This plunger carries a crown from which the weights are suspended. There are 18 cast-iron weights about 7.5 ft. in diameter and 7.9 in. thick. The total pressure acting on the plunger is about 167,000 lbs. The joint between the plunger and the cylinder consists of a stuffing box packed with hemp, plaited square and soaked in a mixture of tallow and Russian petroleum. Each accumulator is provided with a differential check valve in the supply pipe, which is ordinarily kept open by the pressure from the pumps, but which should close in case of a sudden drop in pressure in the supply pipe. A small port is, however, left open in this event, which permits the weighted plunger of the accumulator to descend slowly. On the accumulators, which are directly connected to the pumps, there are also weighted safety valves, which are lifted by the upper weight of the accumulator when the upper end of the stroke is reached, and thus allow the water supplied by the pumps to flow into the return pipes.

In order to prevent the loss of power which would follow from the continued operation of the above-mentioned safety valves, each engine is fitted with a slide throttle valve which is connected by levers and chains to a tappet lever which is operated by the accumulator. When the latter approaches the upper limit of its stroke the throttle is thus automatically closed and is again opened when the accumulator plunger descends.

From the casing of this throttle valve a pipe leads to the low-pressure cylinder for the purpose of admitting steam direct to that cylinder in starting. This pipe contains a valve which is controlled by the ball governor, so that the valve is kept closed, except in starting, or when the speed falls below that desired. Between this valve and the low-pressure steam chest is a valve designed to maintain a pressure of about 23 lbs. per square inch in the low-pressure steam chest.

The main steam pipes are so connected that any engine may be supplied with steam from any boiler. Flap valves are provided in the main steam pipes for the purpose of automatically closing off either pair of boilers in case of a considerable reduction in pressure in that pair. These valves can also be operated by hand.

Texas Continues to Discover Novelties.

The Laredo Times says: The Mexican National road is expecting every day from the Baldwin Locomotive Works one of the latest pattern compound engines, with three steam cylinders. The third cylinder is to be used for setting brakes, and it is claimed that the heaviest locomotive running at full speed can be "choked" down to a full stop at a distance of 40 ft.

*A paper presented at the XXIII meeting, Richmond, November, 1890, of the American Society of Mechanical Engineers, by T. B. Almond.



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EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

We are at last able to put before our readers the information collected by the General Time Convention's Committee on Safety Appliances, in its investigation of the matter of automatic couplers. We have condensed a good deal of the material, which is printed at length in the Report of the Proceedings of the Convention, but have omitted no essential matter except the names of the 58 railroads which replied to the circular. Those 58 roads include many of the larger systems, but many others, unfortunately, did not reply. Among the delinquents are, for instance, the Atchison, Boston & Albany, Chesapeake & Ohio, Burlington, St. Paul, Rock Island, Lackawanna, Illinois Central, Lake Shore, Lehigh Valley, New York Central, Northern Pacific, Old Colony, Southern Pacific and the Union Pacific. These include some roads that have taken a very intelligent interest in the M. C. B. coupler and have a considerable equipment with it and detailed records of its service. They include also some of the roads that have made the most resolute opposition to the M. C. B. coupler. While these last did not think it worth while to help the Time Convention to form a correct opinion on a matter of great financial and technical importance, they doubtless reserved the right to find fault with the conclusion reached. We must expect to hear from them that the committee acted with quite insufficient information, and that the Time Convention ought to have returned the report to the committee for further investigation. So dignified a body as the Time Convention could not say to the grumblers, "put up or shut up," but we trust that it will express this idea in its own stately English when the time comes.

The report has not much statistical value; the data of service and of cost of maintenance which we have published are far more complete. Its chief value is as an expression of opinion and the experience on which that opinion is based, while considerable is still too new and incomplete to be put into any definite form. The most that can be said of the opinions collected by the committee is that they establish a strong presumption that the M. C. B. coupler will be acceptable, and they show plainly that there is nothing else that is anywhere near being generally acceptable. There is a substantial unanimity in the replies on these points. It follows then that the best hope, and the only one now in sight, of getting a uniform automatic coupler is to push the M. C. B. type, and, therefore, the action of the Time Convention is in the line of public policy, and is justified and should be supported. This is a logical conclusion from the evidence of the report before us. Of course there was a mass of other evidence which the members of the Time Convention had become more or less familiar with, and which had its weight. Possibly it had even more weight than the opinions collected by the committee.

Some interesting facts developed in a recent inspection of a considerable air brake equipment have lately

come to our knowledge. Probably the air brake is nowhere subjected to rougher use than on ore cars on lines of heavy grades. There is a good deal of air brake equipment in such service on the ore-carrying roads reaching Lake Superior ports, and the inspection to which we refer was of the brake equipment on a large number of Wisconsin Central ore cars which have been in constant use during the past season. A careful test was made of four trains composed of from 25 to 40 cars each. The brake apparatus was found in much better condition than had been anticipated. Every triple valve worked properly and there were no leaks in pipes, triples or other parts. It was found, however, as is so very often the case, that there was much negligence in taking up the slack of the foundation rigging, as many of the pistons had the maximum travel. This whole brake gear was designed by the Westinghouse Company, and its application to the cars was, to a certain extent, supervised by that company, and the condition in which it was found after continuous hard work in such rough service may be taken as very good evidence of what the best brake gear is capable of standing. But the fact that many of the pistons were found to travel the length of the cylinders without getting their maximum effect, is another instance of the failure of railroad officers to appreciate the immense importance of keeping the foundation rigging up to its proper condition. Of course, there is practical difficulty in maintaining the strict and thorough inspection necessary to secure this end, but we have no doubt that when its importance is thoroughly understood such inspection will be secured in spite of the difficulty.

Two of the collisions reported in our accident record, printed in this issue, that at Sloan's Valley, Ky., on the 22d, and that near Warwick, Pa., on the 25th, have been followed by legal proceedings, under the criminal laws, against the conductors and engineers who were responsible. Similar action has been taken in connection with a collision which occurred near Scranton, Pa., Nov. 5, and in this and the Kentucky case the proceedings were instituted by the railroad company. This is decidedly unusual, if not unprecedented, and the outcome will be watched with interest. As every one knows, prosecutions of trainmen for negligence rarely amount to much. Crimes resulting from heedlessness are hard to secure convictions on in any event, appeals to the sympathies of jurymen being peculiarly effective in this class of cases; and when, as often occurs, the accused succeed in showing that a superior (or even a fellow-servant) has been slightly negligent in some respect, these appeals are almost sure to succeed. It is, therefore, gratifying to learn that the railroad companies have moved in these two cases, both of which appear to be flagrant breaches of trust. Even if it should prove that the companies were in some slight degree responsible for these derelictions, it is to be hoped that the officers will be brave enough to prosecute the cases to definite conclusions. Like the superintendent who was mentioned in these columns a short time since, the *Railroad Gazette* holds that the management of a railroad should always deem itself responsible for all possible delinquencies, giving the employé—perhaps we should say the public (the victim)—the benefit of any doubts; but in either case the light of publicity as brought out in a court is needed and should be forthcoming. The superintendent referred to said that for every brakeman's blunder he himself felt ashamed, because he had appointed or tolerated an inefficient man. In editorial utterances we have held that a conductor's or engineer's sleepiness (resulting in a blunder) is often morally chargeable against the company, although the formal rules provided very fully for throwing the responsibility upon the employé alone. Sleepiness often results from overwork (though oftener, perhaps, from dissipation); and how far different is overwork by the company's acquiescence from overwork by the company's order? Our superintendent may be charged with setting up a higher standard than he would like to bind himself in legal form to carry out, and editorial opinions may be looked upon as idle speculation, but—let us see what the courts say.

Passenger Rates and Passenger Receipts.

In judging of railroad economy in different countries it is a common error to take schedule rates in one and compare them with average receipts in another, treating the two results as substantially equivalent. This is entirely wrong. The average receipts are brought down by excursion and commutation business so that they are not only lower than the average rates of schedule fare, but often a great deal lower. Thus, on the New York, New Haven & Hartford the regular

rates are 2 cents on the main line and 2½ cents on the branches, the latter forming three-quarters of the total mileage; so that an outside observer would suppose the average rate of fare to be something like 2¼ cents a mile; but the average receipts are about 1.8 cents a mile, and have at times been lower, before so many branches were operated by the company. The New York Central, with somewhat similar apparent rates, has actual receipts of 1.9 cents per passenger mile. In almost any case the discrepancy between the nominal rate and the actual average receipts will be found to be something like this, the latter being as a rule at least 10 per cent. lower than the former.

In any comparisons between England and America, injustice is apt to be done the former. England gives no figures of passenger mileage, so that it is impossible to make a direct determination of the average receipts. On the other hand, America has no well-defined standard of railroad fare prevailing through the country, so that the average receipts are the only figures we possess. In his article in Scribner's "American Railway," Horace Porter makes a direct comparison between European rates of fare and American average receipts; and though he takes care to call attention to the fact that the standard is not quite the same in the two cases, few of his readers understand how great the difference really is. Mr. Dorsey goes one step farther, and attempts to determine English passenger mileage by dividing the passenger earnings by an estimated average rate of fare; a method which, if applied to the New York, New Haven & Hartford Railroad, would give a result some 20 per cent. out of the way. It may perhaps be said that the English railroad companies deserve such misjudgment by their obstinacy in refusing to give figures of passenger mileage; but we are not so much concerned with dealing out just measures of opprobrium as with ascertaining the facts of the case.

The standard English rates for regular tickets are about two cents for third class, three cents for second and four cents for first. Possibly these figures are a little low, but they are substantially those of Mr. Dorsey. To find the average regular fare, omitting commutation, we should have to multiply each of these rates by the amount of travel in the corresponding class, and divide the result by the total amount of travel. In the year 1889, of 683,000,000 passengers carried in England and Wales, 88 per cent. were third class, 8 per cent. second and less than 4 per cent. first. If we assume that the average length of journeys was the same in the different classes, we obtain the average regular fare for all travelers as follows:

$$\begin{array}{r} 88 \times 2 = 176 \\ 8 \times 3 = 24 \\ 4 \times 4 = 16 \\ \hline 216 + 100 = 2.16 \text{ cents.} \end{array}$$

If, however, we assume that the average first class journey was double the third, and that of the second intermediate between the two, which is probably not far from the truth, we have the following results:

$$\begin{array}{r} 88 \times 2 = 176 \\ 8 \times 1\frac{1}{2} \times 3 = 36 \\ 4 \times 2 \times 4 = 32 \\ \hline 244 \end{array}$$

to be divided by

$$88 + 8 \times 1\frac{1}{2} + 4 \times 2 = 108$$

giving a quotient of 2.26 cents. There is probably no great error in saying that 2¼ cents a mile is the average of English regular passenger fares.

In America the average receipts per passenger mile are 2.18 cents. This would indicate an average regular fare of at least 2.40 cents, and probably 2.50 cents would be nearer the truth. The evidence seems to indicate that American passenger fares are about ten per cent. higher than English, making the basis of comparison as nearly as possible the same.

The service rendered in the two countries is not widely different in quality. The English trains run faster; the American cars are on an average much more comfortable. While the third class carriages are no longer the cushionless affairs which prevail on the continent, it is only on the better class of trains on the northern lines that they are pleasant vehicles to travel in. Still, it is not in quality of service but in density of traffic that the English roads find their economy. Where we have a density of traffic like that of England, we probably enjoy somewhat lower rates than the English traveling public. Whatever difference there may be in any case slight; and the wild statements which are frequently made on the subject are only serviceable in illustrating the liability of statistics to misuse.

The figures on the continent are apparently much lower; but this difference is more apparent than real. Not only are the trains slow, but, as we have often pointed out, the proportion of train service to population is small. Any railroad man can make low pas-

senger rates if the public will content itself with few trains in proportion to the number of travelers. It is because the American and English public care more for facilities than for cheapness that they are compelled to pay higher rates. They know what they want, and get it, paying about the same price for it on either side of the Atlantic.

Making Rules Plain.

The *Railroad Gazette* has often urged the necessity of supplementing the brief paragraphs in the train-rule code by fuller explanations. Probably because of the universal American fondness for brevity and terseness, our train rules are more noted for those qualities than for any other literary characteristic. The standard code is in this respect no different from its predecessors, though in that we find terseness to be a virtue much oftener than in other codes. Rules for train and station men must necessarily be given some explanation, as long as college graduates are unavailable for this branch of the service, and the amount of explanation necessary will often depend upon the brevity of the formal rule.

Explanations are made orally and by circular. Oral explanations are subject to the limitations of the man who makes them and lack uniformity, and for these reasons have in practice come short of the ideal of perfection that ought to be expected as their natural result; but we have strongly commended them because they tend so certainly in the right direction, and because they are immeasurably better than nothing, the last word expressing the true state of things as regards this department of discipline on many roads. Not that it is universal on any road, but many men go on month after month in ignorance of important requirements simply because they have not been questioned to see what they know. Testing their knowledge (or lack of it) implies instruction, and so we include both under the head of Explaining the Rules. As has been truly said, a very brief code of rules will cover all essential points, provided it is fully comprehended.

To insure this the printing press is an important ally. Take the Pennsylvania code, for instance. The rules from 200 to 300, taking up points not covered by the standard code, are of high value and have evidently been prepared with an amount of care and labor that makes them fit to stand beside the Time Convention's work; but they are very brief and a single paragraph in many cases covers a matter which has often been made the subject of a long circular. This brevity needs amplification and it often has it, but doing it merely by word of mouth wastes much time. The Burlington and the Erie have done a large amount of good work in explaining rules to employes, and their action is praiseworthy; but to get its full value the proceedings should have been more fully preserved in black and white for future use.

The foregoing reflections are simply meant for an introduction to a circular of the Savannah, Florida & Western, printed on another page. The circular is not perfect, and, indeed, it may be doubted whether any one can make a perfect rule for such a difficult practice as protecting trains by flag; but its spirit, the evidence it bears of the manager's desire to assist his men in every possible way, are the points specially worthy of notice. The dilemma a train encounters when it is losing time, and should according to rules protect itself, and yet knows that the following train is also losing time; the difference between being "delayed beyond leaving time," and simply being behind time; the fine points involved in deciding when rule 99 must take the place of 96 or 97; these and other conundrums are not solved, but Colonel Haines' example is nevertheless one to be followed. Every road should have circulars of this kind, touching dozens of the rules, and should then change them from a bunch of circulars to a book or manual. The worst fault of these documents is their temporary character. They are, indeed, hung up on bulletin boards, and sometimes attention is called to them by subsequent circulars, as has been done with reference to circulars 299 and 300 by Colonel Haines in this case; but to give them full permanent value they must be put on an equal footing with the rule-book itself. Instead of calling attention to orders of such and such ancient dates, which are very likely now covered with dust and fly specks, the superintendent should be able to call attention to a document which is regarded as fresh and new to-day. Such is the rule-book, though many of its rules were made 20 years ago. Then, if attention is called often enough, and a response to the call is enforced, the value of the thoughts embodied in the documents will be intensified a hundredfold.

The constant influx of new men is sufficient reason

for instituting a regular plan of testing employes' knowledge of the rules periodically, but in addition to this every one knows that old employes become rusty. Issuing a new circular on an old rule is not always so good a plan as to simply reapply the same rule in the same words, especially when two or more circulars have been issued in the course of a few years on the same subject; the men are likely to get the idea that the officer issuing the circular is not satisfied with his own rule. New phrases give to many men too emphatic an impression that the main ideas are new, whereas they are not. A circular intended to be merely explanatory of an old rule is thus regarded more or less as a new rule, and respect for the rules in general is thereby weakened. Col. Haines' circular avoids this fault more completely than is generally done, and we therefore hope it will be carefully examined by all superintendents.

Construction of Fire Boxes with a View to Repairs.

In answer to a letter which appears on another page we give the following notes:

All of the recent designs of locomotive boilers in this country are so arranged that the back head of the boiler must be removed before a fire box can be put in. Formerly, before the present large fire boxes were used, there was sufficient width between the sides of the outer fire box shell at the bottom to allow the inner fire box to be dropped vertically down through it. Thus the fire box inner shell could be removed without taking the rivets out of the outer shell. Only the rivets in the foundation ring had to be removed. But since we have been using wide crown sheets this has become impossible, and we now almost invariably remove the back head of the outer shell and slip out the fire box as a whole, make repairs to the box, and put it back again. If only a new tube sheet is wanted, one is made of the proper dimensions and put in through the bottom of the box and then swung around into place.

We have no difficulty in making tight joints the second time, as the original lap for a single joint is often made $2\frac{1}{2}$ in. wide and seldom less than $2\frac{1}{2}$. This gives sufficient lap for several renewals, as a 2-in. lap will do in case of repairs. Our correspondent thinks there might be a difficulty in making the original wide lap joint tight; but while we do have this difficulty sometimes, yet with large rivets with large heads, put in by hydraulic power, the trouble from leakage is very small, and more particularly so when the shells are well fitted together.

The late Mr. Stroudley, of the London, Brighton & South Coast Railway, of England, had an admirable rule for fitting up shells. He would only allow the boiler makers to use a small hammer and to make a mark not over $\frac{1}{2}$ in. in width and less than that in depth at the calking edge. If the boiler was not tight with that amount of calking, the "fitters up" had to "catch it."

The fire hole flange, fig. 2 (see the letter referred to), has the advantage mentioned by our correspondent, namely, the rivets can be driven after the stays are in. This flange was also designed to have still another advantage, that of keeping the calking edges of the sheets well removed from the fire. This last advantage, as well as the first, was obtained. But contrary to the expectation, more trouble has been experienced with this style of fire hole flange from burning out than with any other commonly used, and it has been abandoned on many roads, and that shown in fig. 1 is used in preference. While it is true that the rivets of the joint in fig. 2 cannot be driven after the stays are in, providing they are through rivets, yet this is no great disadvantage in building a new boiler or in putting in a new fire box. In case of a leak, however, a through rivet cannot be used; then recourse is had to a patch bolt, which is merely a countersunk-head, tap bolt, which is formed on the end of a short piece of steel or iron and screwed into the rivet hole, which has been previously tapped for that purpose. The head is then cut off close to the sheet.

On the whole, we think that fig. 1 is the design of fire hole flange which has given the best satisfaction here, as it is found in many places impossible to use the design shown by fig. 2, owing to the collection of mud in the V-shaped pocket above the door opening, which almost invariably causes the sheet of the inner fire box to burn at that point. Sometimes cleaning plugs are placed above the door to enable the removal of mud collected there; but even this, probably owing to the lack of attention, has not brought this joint into favor where the feed water is bad.

With regard to the teachings of the experiments on the Paris, Lyons & Mediterranean road, in the matter of long and short tubes and fire boxes, we must say that those experiments were not intended to show the

relative advantages of a given fire box area and a given tube area, but rather to show the values of different lengths of tubes and different areas of tube heating surfaces in combination with a short and long fire brick arch and a water arch. We doubt very much if sufficient information can be gleaned from the results of those experiments to enable one to answer our correspondent's question. However, this can be said, that when tubes are less than 12 ft. in length, under the conditions of operation of a locomotive boiler, an addition of 1 ft. to the length is a decided advantage whereas, when the tubes are more than 12 ft. in length, say 15 or 16, then an addition of 1 ft. decreases the steaming capacity per minute of time, and slightly increases the economy. With a long tube a heavier draft must be used to give the same steaming capacity. This was proved beyond question by the French experiments.

It is our opinion that when tubes are not over 8 ft. in length a foot added to the length of the tubes is almost as advantageous as the addition of a foot to the fire box, provided always that the number of tubes be as great as can be put into the tube sheets, and also that the comparison be made when the fires are being forced. For greater lengths than this, probably an increase in the length of the fire box is of greater advantage than an equal increase in the length of the tubes. Our correspondent excepts the advantage of the increased grate area, and it is under that exception that the foregoing statements are made. Without this exception, and with the advantage of the greater area which would be obtained under the conditions of American locomotive operation, we must conclude that even for tubes as short as 9 ft. the total advantage of 1 ft. in length is greater than that of 1 ft. additional length of tubes.

October Accidents.

Our record of train accidents in October, given in this number, includes 152 collisions, 115 derailments and 16 other accidents, a total of 283 accidents, in which 88 persons were killed and 380 injured. The monthly records are now so long that a part of the less important accidents are this month summarized instead of being printed in full. See note at the head of the record.

These accidents are classified as follows:

COLLISIONS:		
Rear.....	60	
Butting.....	49	
Crossing and miscellaneous.....	34	152
DERAILMENTS:		
Broken rail.....	2	
Loose or spread rail.....	4	
Broken bridge.....	3	
Defective switch.....	3	
Defective frog.....	3	
Broken wheel.....	5	
Broken axle.....	8	
Broken truck.....	2	
Broken brakebeam.....	3	
Broken car.....	1	
Broken drawbar.....	3	
Misplaced switch.....	10	
Bad switching.....	1	
Bad loading.....	1	
Track repairs.....	1	
Cattle on track.....	4	
Wagon on track.....	2	
Landslide.....	1	
Sand drift.....	1	
Washout.....	2	
Malicious obstruction.....	1	
Accidental obstruction.....	2	
Unexplained.....	50	115
OTHER ACCIDENTS:		
Boiler explosion.....	4	
Fire in car.....	2	
Broken side rod.....	1	
Miscellaneous.....	9	16
Total number of accidents.....	283	

The causes of collisions, where given, were as follows:

	Rear.	Butting.	Crossing and other.	Total.
Trains breaking in two.....	12	12
Misplaced switch.....	5	5
Failure to give or observe signal.....	10	3	2	15
Mistake in giving or understanding orders.....	..	6	..	6
Miscellaneous.....	10	12	8	30
Unexplained.....	32	25	22	79
Total.....	60	49	34	152

A general classification shows:

	Col- lisions.	Derail- ments.	Other.	Total.	P. c.
Defects of road.....	15	..	15	5	
Defects of equipment.....	12	22	8	42	14
Negligence in operating.....	61	13	6	80	28
Unforeseen obstructions.....	..	15	2	17	6
Unexplained.....	79	50	..	129	46
Total.....	152	115	16	283	100

The number of trains involved is as follows:

	Col- lisions.	Derail- ments.	Other.	Total.	P. c.
Passenger.....	49	39	9	97	23
Freight and other.....	242	78	7	327	77
Total.....	291	117	16	424	100

The casualties may be divided as follows:

	Col- lisions.	Derail- ments.	Other.	Total.	P. c.
KILLED.					
Employes.....	31	17	3	51	51
Passengers.....	3	3	3	9	10
Others.....	6	2	..	8	9
Total.....	60	22	6	88	100
INJURED.					
Employes.....	133	62	9	204	54
Passengers.....	70	81	14	165	43
Others.....	6	2	..	11	3
Total.....	209	145	23	377	100

The casualties to passengers and employes, when

divided according to classes of causes, appear as follows:

	Pass. killed.	Pass. injured.	Emp. killed.	Emp. injured.
Defects of road.....	1	6	3	16
Defects of equipment.....	—	27	5	16
Negligence in operating.....	6	85	53	189
Unforeseen obstructions and maliciousness.....	—	1	5	16
Unexplained.....	2	46	5	17
Total.....	9	165	71	204

Sixty-two accidents caused the death of one or more persons each, and 74 caused injury but not death, leaving 147 (52 per cent. of the whole) which caused no personal injury worthy of record.

The comparison with October of previous years shows:

	1890.	1889.	1888.	1887.
Rear collisions.....	69	56	42	35
Butting ".....	49	35	29	28
Crossing and other collisions.....	34	21	11	1
Derailments.....	115	70	58	49
Other accidents.....	16	8	6	4
Total.....	283	190	146	117
Employees killed.....	71	43	45	20
Others.....	17	8	75	14
Employees injured.....	204	133	120	50
Others.....	176	91	103	59
Passenger trains involved.....	97	73	54	38
Average per day:				
Accidents.....	9.33	6.13	4.71	3.77
Killed.....	2.84	1.65	3.87	1.10
Injured.....	12.26	7.23	7.19	3.52
Average per accident:				
Killed.....	0.311	0.268	0.821	0.291
Injured.....	1.343	1.179	1.527	0.931

Only one accident during the month was the cause of the death of more than one passenger. This one was at Valley Falls, R. I., and is, we understand, being investigated by the railroad commissioner of that state. The other accidents which were fatal to passengers were at Barlow, Mo., on the 26th; Ensley, Ala., 21st; Jasper, Fla., 6th; Sargent, Col., 7th; Monticello, Ga., and Robb, Col. In the Sargent case the passenger was standing on the platform; at Monticello the victim belonged to a circus, and at Robb he was on a freight train. One of the most reckless cases of the month was that at Ensley, on which, as will be seen by the details printed, comment is superfluous. The butting collision at Sloan's Valley, Ky., on the 22d, was also caused by the grossest negligence. Some comment on this will be found in another column. The butting collision at Clarine, Or., on the 23d, is also one whose cause is worth noting.

Engineer Burns, of the passenger train which was in the triple wreck near Silver Creek, N. Y., on the 19th, and engineer Murphy, whose engine exploded near Huntington, Ind., on the 11th, have each been the subject of a large amount of notoriety in the newspapers in consequence of their discreet and courageous conduct in these cases. They have, in fact, been called heroes, but it is questionable whether the heroic qualities exhibited were very different either in kind or degree from those manifested by runners every day. Burns receives great credit for having increased his speed, instead of trying to stop, when he saw that he could not avoid striking portions of the freight wreck; but in point of fact it seems that he endeavored to stop just as soon as he could, taking the same action that any experienced engineer would take. We do not chronicle this fact to detract from the glory accorded Mr. Burns, for he doubtless did just the right thing at the right moment, for which any man in his position deserves marked credit; but the case illustrates how right conclusions are often drawn from wrong premises. It was said that Murphy was thrown into the ditch by the explosion and had his leg broken; and that in this condition he crawled some distance with a red signal to warn an approaching train. But it appears that his leg was not broken, and from all accounts, one of the worst fractures in the whole case was that of the truth in the reporter's story. It is to be noted that under the absolute block system, which will be universal in the United States when the millennium arrives, a wounded engineer lying in the ditch will not need to worry about the safety of other trains.

According to a New York paper, a freight engineer on the New York, New Haven & Hartford was discharged Oct. 20 for running five miles on the wrong main track (in the night). A train on the Panama road about Oct. 1 was struck and damaged by a large tree, which was shattered by lightning just as the train passed it.

At Cleveland, O., on the 3d an electric street car was struck by a freight train of the Cleveland & Pittsburgh road and was wrecked, in consequence of the trolley wheel running off the wire. A similar collision happened at Sioux City on the 26th, though the cause there seems to have been negligence of the man in charge of the street car. The collision was not so bad as the other, but several passengers were injured.

Annual Reports.

New York, Lake Erie & Western.—The annual report of this company for the year ending Sept. 30, 1890, has just appeared. The results of operation are:

	1890.	1889.
Earnings:		
Passenger.....	\$5,569,508	\$5,301,378
Freight.....	15,546,279	13,441,460
Coal.....	6,827,120	7,110,780
Total (including miscellaneous).....	29,942,907	27,853,618
Due leased lines.....	2,614,101	2,409,133
	\$26,454,834	\$24,505,273

	1890.	1889.
Operating expenses:		
Conducting transportation.....	\$7,917,318	\$7,221,459
Motive power.....	6,012,387	5,311,435
Maintenance of cars.....	1,987,841	2,056,914
" " way.....	3,071,523	2,777,098
General.....	516,882	487,518
Total.....	\$19,505,951	\$17,854,925
Per cent. of operating expenses.....	67.10	68.12
Net earnings.....	\$6,948,883	\$6,740,848
From other sources.....	1,090,016	1,076,505
Total.....	\$8,038,899	\$7,817,353
Interest, etc.....	7,178,645	7,042,577
Surplus.....	\$660,254	\$774,776

The earnings per ton mile were:

	1890.	1889.
Merchandise freight.....	0.753 cent.	0.770 cent.
Coal.....	0.536 cent.	0.566 cent.

The tonnage and ton miles of freight increased, but the ton miles of coal fell off from previous years. The passenger traffic continues to grow fast and particularly in the local business. This must be gratifying to the gentleman who brought into the councils of the Erie the idea of developing the local business by rational methods—an idea which for years was entirely wanting to that company.

The heavy increase of maintenance of way will be noticed, amounting to almost \$300,000. This we suppose will be largely accounted for in the expenditure for repairs and renewals of bridges. Nearly 1,000 ft. of iron and steel bridging was put in at a cost of \$220,000. About \$118,000 was expended also in ballasting 130 miles of track.

A number of interlocking plants were erected during the year, and a very extensive system is now being put in in the Jersey City yards.

One of the most important transactions of the year was the change in the lease of the New York, Pennsylvania & Ohio. The old lease provided that the company should pay a rental of 32 per cent. of the annual gross earnings of the N. Y., P. & O. up to earnings of \$6,000,000. Above that the rental should increase one-tenth of one per cent. for each \$100,000 of increase in gross earnings. By the change in the lease the basis of payment remains the same, but the percentage decreases one-tenth of one per cent. for each \$100,000 of increase in earnings until such earnings are \$8,000,000, and when the earnings equal \$9,000,000 the percentage to be paid is reduced to 28 per cent. of the gross earnings. It is quite obvious that this is a much more reasonable basis of rental.

The report also mentions the sale and reorganization of the Chicago & Atlantic Railway, which now belongs to the new Chicago & Erie Railroad Company. The capital stock of the latter is \$100,000, all of which is owned by the New York, Lake Erie & Western. This road was turned over to the new company Sept. 1, and, with the N. Y., P. & O., gives the Erie its own line from New York to Chicago. The maximum grades on the Chicago & Erie are 26 ft. An immediate outlay of a considerable sum is being made on the tracks, bridges and other structures and arrangements are now being made to provide for an increased equipment of cars and engines.

NEW PUBLICATIONS.

Practical Treatise on Injectors as Feeders for Steam Boilers.—For the use of Master Mechanics and Engineers in charge of Locomotive, Marine and Stationary Boilers.

Under the above title Mr. Geo. N. Nissenon, Engineer, of New York, publishes a pamphlet in which he explains in a practical way the principle of action of the injector. These are points on which all those who have to do with the injector should be posted—and yet very few of the great army of engineers and firemen clearly understand how it is that the injector so successfully supplies the boiler with water. The author in a short preface states that his book is intended for the practical man.

The introduction gives due credit to Gifford for applying the injector principle to boiler feeding and credits Sellers & Co. with the introduction of the device into this country. The verdict of the Master Mechanics' Association in 1875, acknowledging the superiority of the injector as compared with the pump for locomotives, is mentioned.

All mathematical formulae which would confuse the practical man are omitted. The velocity of an issuing jet of steam under a given pressure through an opening of unit section is compared with that of a jet of water from a similar opening under the same pressure. In the former the velocity is shown to be 1,835 ft. per second against a velocity of 93 ft. per second in the case of the latter. With the aid of a sectional view of an injector, the manner in which the steam jet communicates its velocity to the water is shown. A simple calculation shows, in the example given, that the steam jet will combine with 13 times its weight of water with a resultant velocity of 131 ft. per second with which to overcome the 93 ft. per second velocity of the water jet. The higher velocity of the feed stream causes it to enter the boiler in a steady stream.

The various nozzles which are common to all injectors are next described, the difference in lifting and non-lifting injectors pointed out and the connections for attaching an injector fully defined.

"Suggestions to Engineers" explains the causes which render the injector defective in action, and will doubtless help many engineers in locating and curing the ills of their boiler feeders.

The descriptions are evidently taken from makers' catalogues and give the most approved types of injectors, lifting and non-lifting, adapted to all kinds of

service. The advantages are shown which an injector offers as a means of giving a fire pressure to the water supply, and reference is made to the action of the Pennsylvania Railroad Co. in equipping some of its locomotives with injectors in place of pumps, for fire service, as an evidence of the appreciation of the value of the injector for the purpose.

Triple-expansion Engines and Engine Trials. By Prof. Osborne Reynolds. Edited by F. E. Idell. No. 99, Van Nostrand Science Series.

This is a reprint of a paper read by Professor Reynolds before the Institution of Civil Engineers, in December, 1889, together with an abstract of the discussion upon the paper in which Messrs. Comper, Bodmer, Williams and others took part. The paper consists of a description of an engine erected for experimental purposes at the Whitworth Engineering Laboratory, Owen's College, Manchester, an account of the method followed in making tests, and a tabulated record of six representative trials. The engine was designed wholly for experimental work and really consists of three independent inverted cylinder engines which can be used as simple engines, or as compound engines with or without a condenser, or as a triple-expansion engine. In the trials which are described in the paper, it was worked as a triple-expansion engine only, but the six trials for which the data are given include three with the cylinders and receivers jacketed with steam at the boiler pressure of about 200 lbs., and three with the cylinder jackets shut off. The results given in the tables are as follows per indicated horse power per hour (a), with steam jackets and (b) with jackets empty:

	(a)	(b)	(c)
Pounds of water.....	14.2	13.25	12.68
Pounds of water.....	17.3	16.00	15.9
Pounds of coal.....	1.5	1.33	1.33
Pounds of coal.....	1.85	1.66	1.62

These figures furnish information in regard to the effects of steam jackets, but, on account of the methods of record employed, are not directly comparable with those obtained in what we may call commercial tests of engines.

The paper is a very valuable one, and well worth reprinting in the convenient shape in which it is presented, and it is to be hoped that the results of subsequent tests of this engine will be equally accessible.

TRADE CATALOGUES.

Thanksgiving Souvenir of the Mason Regulator Co., Boston. This unique circular consists of a "folder" made of cardboard containing chiefly points of advice offered by this firm to its customers as to what kind of wishing they should celebrate this anniversary with. Within the folder is a genuine, life size kiln-dried wishbone, alleged to have been taken from a full-size native-born, pure-blooded New England turkey. In view of the wide circle of patrons which this firm has and must have favored with this circular, the question where so many wishbones came from at once arises in the minds of the curious. Dismissing as unworthy all suspicions that these wishbones, like nutmegs and other articles hailing from New England, may possibly have an occasional counterfeit interspersed among them, and throwing aside as equally untenable the theory that the so-called spring chickens of Boston restaurants may have contributed to this large supply of "good luck," we must conclude that hundreds or thousands of turkeys have actually been devoured in the office of the Mason Regulator Co. To think of the lengthy period through which this process must have been kept up makes one fairly dizzy. Although we cannot now place our finger upon the exact article we have in mind, we have a distinct recollection of some kind of "regulator" among the patent medicine advertisements which we think would be appropriate to this case. Certainly no ordinary regulator worked by steam could be depended upon to overcome such a difference in pressures as must exist after a test made under such severe conditions.

Foreign Notes.

One of the three great Italian railroad companies, the Mediterranean, has followed the German practice in establishing schools for its shop apprentices, intended to qualify them for service on the railroad. The apprentices compete for admission to the schools, and 20 are admitted to each school in each year.

An Austrian railroad, having two branches partly completed, whose present terminal stations have no turn-tables, applied to the government authorities for permission to haul freight trains on these branches with the locomotive reversed—tender ahead—which is forbidden by the government regulations. Permission was granted on condition that the speed prescribed in the time-tables should not be exceeded, and that a trainman be posted on the tender at the head of the train to watch the track and the signals.

In the year 1889 the whole Russian railroad system carried 41,569,000 passengers and 61,843,470 tons of freight, on 17,602 miles of railroad, earning about \$8,200 per mile—which would make our railroads rich. The entire imports by rail and by water are reported to have been but 822,633 tons—an incredibly small quantity.

The Austrian State railroads have had in use for four

years a portable telephone apparatus, constructed by their telegraph superintendent, Mr. Franz Gattinger, which is carried on a train and can be attached anywhere to any telegraph wire in two or three minutes, thus establishing communication between any point on the line and the adjacent stations. At the time of the fall of a bridge a year ago, especially, this apparatus did excellent service, and proved so effective that it remained the only electrical communication from the site of the bridge during the three months while it was being reconstructed. The whole apparatus is contained in a box about 9 in. x 10 in. x 4½ in.

Nothing surprises an American in Europe more than the frequency with which he meets cog-wheel railroads, rope railroads, or other means of riding up steep ascents. It is not only on some of the Swiss mountains, famous as points of view, that they are found, but as parts of considerable lines in hilly districts, and as approaches to ancient towns which were built on the summits of the steepest hills at a time when the very first requisite of a town site was that it be easily defensible, as, for instance, at Orvieto in Italy; while Naples has (at least had well advanced two years ago) two lines up the steep slope from the old town to the surrounding heights, which afford much needed building ground above that unspeakably lovely and unspeakably dirty city, while many little hills at Swiss resorts are provided with them. A recent statement concerning the four most important strictly mountain roads may be interesting:

	Vitanau- Rigi.	Goldau- Rigi.	Pilatus.	Monte Generoso.
Horizontal length, miles.....	4.25	5.37	2.65	5.24
Difference of elevat on of ter- minal, ft.....	4,284	4,319	5,310	4,313
Steepest grade, per cent.....	25	20	43	32
Speed allowed on steepest grade, miles per hour.....	4½	5	2½	4½
Radius of sharpest curve, ft.....	589	458	293	198
Maximum weight of train, lbs.....	59,400	66,000	24,740	52,500
Average tractive force, lbs.....	8,800	8,030	8,300	6,160
Maximum number of passen- gers, per train.....	60	60	32	60
Gauge.....	4 ft. 8½ in.	4 ft. 8½ in.	3 ft. 6 in.	3 ft. 6 in.
Fares:				
Up.....	\$1.35	\$1.54	\$1.93	\$1.45
Down.....	.68	.77	1.16	.97
Round trip.....	2.03	2.19	3.09	1.93

The railroad up Pilatus, the highest and steepest of all, was opened last year; that of Monte Generoso, on the Italian side of the Alps, from which the Italian lakes and the great Lombard plain are visible, and the great peaks of the Alps on the side illuminated by the sun, was opened this year. High charges are made for baggage and for freight on these lines, but most passengers do not take any baggage, as they rarely stay at the summit more than one night, and the freight is almost exclusively supplies for the hotels.

A new "Imperial Train" has been built for the Czar of Russia to take the place of that which was shattered in the accident Oct. 29, 1888. The new train consists of 10 cars, one for the Emperor and Empress, one for the Grand Duke heir apparent, one for the other grand dukes and duchesses, two for the suite, two for the servants, one drawing-room car, one kitchen car and one for a workshop. The train is fitted with electric lights and signals, and the most perfect springs, brakes and other appliances which the authorities could imagine. The interior furnishing is simple, and superfluous ornament is avoided. In the Emperor's car, at his desire, the furniture of the old car is preserved. The train is reported to weigh 777,000 lbs., which would be an average of nearly 39 tons per car, but we imagine this must include the engine and tender, unless the cars are covered with plate armor.

The Hungarian passenger traffic in the beginning of the second year of the cheap zone tariff not only maintains the great increase over the traffic of 1888, under the old tariff, but shows a further large increase over last year. In the month of August the number of passengers was:

	1890.	1889.	Increase.	P. c.
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Passengers.....	1,065,174	1,369,457	295,717	21.6
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The increase was chiefly in the passengers for short distances, and the increase in passenger earnings was small. August, 1889, was the first month of the zone tariff, and the number of passengers then was swelled by those who had put off their journeys until they could get the benefit of it, so that the great increase this year is the more remarkable. Of the whole increase of 295,717 passengers this year, no less than 96 per cent. were passengers for short distances—that is, not more than the distance from one station to the second station from it, the rates for such trips being especially low, and not governed by the "zone" tariff properly so-called, though introduced at the same time. The number of longer journeys was less than two per cent. greater than last year. For the first 26 days of September the total increase in passengers was at the rate of 8,918 per day, against an increase of 9,539 per day in August; but the increase in earnings in these 26 days was twice as great as in August, so that there must have been a larger increase in long journeys.

News of the effect of the new Austrian "Kreutzer" passenger tariff has been slow to come. The earnings

of the state railroads for the first six months of the year and for July, the first month of the Kreutzer tariff, increased as follows, in florins:

	Passenger.	Freight.
Jan. 1 to June 30.....	210,597	1,519,111
Average increase per month.....	35,110	253,185
July.....	26,301	190,237

Thus the increase in passenger earnings in July was less than the average of the previous months of the year, and was actually very small (about \$11,270); but considering the large decrease in rates, the result is good. On some lines the passenger travel more than doubled. Later reports show the passenger and baggage earnings to have increased 52,716 florins in August, when, however, the freight earnings increased 483,839 florins.

The regulation of the Prussian State railroads, like those of all or nearly all other railroads on the European continent, require that the engineman and fireman must always stand while their engine is running. A writer in the *Journal of the German Railroad Union* argues at length, or rather writes at great length, condemning the regulation. They should be provided, he says, with comfortable seats, with backs. As it is, the enginemen often provide themselves secretly with some sort of stool, which they hide whenever they think there is danger it may be discovered by their superior officers. In England he says the engineman is usually seated when attending to his duties, and the fireman when he has time; but his model of comfort on a locomotive is the American cab. In closing he says: To increase the comfort of the passengers, at the beginning of the summer season next year, there will probably be placed on various Prussian State railroads trains of so-called American bogie cars, although the construction of these cars will cost a fearful amount of money (ein Heidengeld) and the cost of running will be considerably increased by the large weight per passenger. Would it not be advisable at the same time to make a fair trial of the completely inclosed American cab, provided with seats, on such trains?

It is reported from Austria that since the introduction of the new Kreutzer tariff, which allows no free baggage (in the baggage car), there is a great deal of trouble on account of the great quantities of baggage which passengers bring with them into the passenger cars. "These articles take up so much room that a fourth or fifth passenger coming into a compartment (with seats for eight at least) cannot find place in it even for the most modest hand baggage. He then is apt to get a little support from the conductors in asserting his rights, and when he tries to enforce them himself very unpleasant scenes often occur." It is suggested that the conductors should not permit passengers to enter a car with an unreasonable amount of baggage. But this is easier said than done. The European traveling party is not likely to enter a compartment all at once, and not infrequently the places are taken by a porter bringing the baggage some time before the passengers appear. The father probably is seeing to the shipping of the trunks, while the mother and part of the flock hurry forward to secure good places—one in each corner. How are the trainmen to know whether the baggage is for four or for eight? Heretofore on most trains there was a good deal of spare room, but doubtless a great reduction in fares without any material increase in the number of cars has resulted in filling the Austrian trains pretty full. And it has been by no means uncommon heretofore to find first-class compartments, with seats for seven or eight (one place being taken up by the water closet door on a great many through trains, of late years), uncomfortably crowded with only four or five people, whose baggage cannot all be stowed away on the capacious racks over the seats—about 15 ft. long in all—but encumbers the seats and the floor, and especially makes a small mountain before the closet door.

A Course of Instruction in Railroad Management.*

In our best technical schools the instruction in civil engineering . . . naturally and properly enough has commonly been directed to the preparation of the student for the work of constructing railroads. . . . Safe construction has for many years been taught with considerable completeness, and at the present time the importance of economy in construction is coming to be more fully appreciated year by year. . . . There is demanded from railroad engineers a broader knowledge of many questions connected with the administration and operation of railroads than that which naturally results from instruction in civil engineering, technically considered.

This demand may very properly be met by a course of instruction in railroad management, which, however, should not be too strictly limited and, in fact, ought not to be confined to the needs of students of civil engineering, or even of young men whose life is to be devoted to railroad work. . . . In fact, the importance of the relation of railroads to the government as a public question has far outstripped the ability of legislators or of citizens to deal wisely with it, and there exists a definite need of growth and development in knowledge of railroad matters among our better educated citizens. A course of lectures in railroad management in a technical school should then be arranged, not alone with a view to the better fitting of students for railroad work, it should equally be considered as a branch of liberal education leading to a broader and better citizenship.

At the outset a brief history of railroads from the beginning may well serve as a foundation upon which to build, and this may profitably be followed by a discus-

* By C. Frank Allen, Associate Professor of Railroad Engineering, Mass. Inst. of Technology.—From the *Technology Quarterly*.

sion of the means for internal commerce that existed a century ago, and the progressive steps, including turnpikes and canals, by which railroads became the recognized channels for all long-distance inland traffic. The causes and conditions which led to the consolidation of short independent lines into systems for through traffic would naturally follow, and bring us to the consideration of what a railroad is at the present time, as a basis upon which more readily and understandingly to investigate those general railroad questions and problems which should constitute the most important feature of such a course.

In a lecture delivered a few years ago Charles Francis Adams divided railroad administration into five principal departments: 1. Financial; 2. Construction; 3. Operating; 4. Commercial; 5. Legal—a classification very convenient for our use.

In the financial department the first question is, properly, whether or not to build the line, and its answer should depend upon the probability of its yielding a profit to its projectors, but this profit may be in the form of an indirect return. A discussion of the nature of a railroad corporation, how formed, how the money is secured and how spent will shed much light upon the methods by which profit may be secured; such a discussion should show, for instance, what is the nature of the stockholder's interest in a railroad, and why, in a new and growing country, the proportion of bonds to stock should be large, while in a well settled region, where capital is abundant, the proportion of bonds to stock is likely to be small. . . . Reference should be made to speculation and speculative management and to stock watering in its several forms, some of which are unobjectionable in point of morality, while others are bad enough. It should also be shown in what way accounts are juggled so that dividends may be declared when none have fairly been earned.

The Department of Construction is that in which civil engineering finds its special field. The first question to be decided upon is the route, and it is desirable that the general route shall be settled from an actual examination of the country, previous even to the drawing of the charter. The student should understand that in construction it is often, though not always, the case that economy will result from building cheaply at first, and renewing or improving in a more permanent manner at a later date. . . . These matters touch closely, perhaps, upon the technical in civil engineering; but, in addition, there are matters purely of business management, among the most important of which are the letting of contracts and dealing with contractors. The manner in which specifications shall be drawn, including the basis for estimating the work, may noticeably influence the price of bids, while the personal characteristics of the chief engineer will often affect the cost of work to a considerable extent. The purchase of material, again, offers more than usual temptations to waste. A careful discussion of such questions as those mentioned above is believed to be of the highest interest and importance, and practically outside the matters properly or generally taught as a part of civil engineering.

Taking the Operating Department proper, it was found that, as the business of railroads increased in importance, a superintendent could have personal knowledge of but little of the actual detail work, and as the number of employes became greater and the duties more varied, the necessity for organization became apparent, and now organization thorough and complete has become a very important feature of railroad operation. A schedule of organization should be given, showing a complete system, from the board of directors and the president down to the brakemen, section hands and day laborers. Much light can be shed upon the operation of a railroad by devoting some attention to the character of the duties of many of the officials whose work is important, though not understood or appreciated by the general public; among these may be mentioned, for example, the auditor, the purchasing agent, the car recorder, the train dispatcher, and, perhaps, the more humble hostlers and track-walkers. The organization and discipline of the working force, the methods of payment of trainmen, the adjustment of lengths of divisions and of train-crew runs, the weight of engine, the capacity of cars, the operation of pusher grades, the best business methods for maintaining good track, the weight and general form of rail in case of renewal—these and similar questions have bearing upon the cost of operating, sufficient to deserve special comment, or, in some cases, detailed explanation. The value and use of railroad statistics may be properly considered at this time. The Commercial Department is concerned in securing business, and deals with receipts and revenue. No railroad can be managed profitably simply by economy in operating; it is necessary that the securing of revenue should have very careful attention, in order that the gross earnings may be as large as possible. We should know from what sources railroad receipts are derived, and should understand the general principles upon which success in securing them depends; it should be pointed out that in some cases larger returns can be expected to result only from the development of the country traversed by the railroad; in others, the expenditure of effort should be in an attempt to outdo rival lines. There is an excellent opportunity here to show the student the necessity of recognizing that in many cases the prosperity of the railroad is dependent upon the prosperity of the country, and that this prosperity depends largely upon the facilities and encouragement offered by the railroad itself. . . . Either here or elsewhere some mention should be made of the methods adopted for conducting through freight traffic, including some discussion of car "mileage" and "per diem," of classification of rates, of differentials, and various other matters of interest of a similar character.

The Legal Department is not of a character to require that much time should be devoted to a description of its work. It is, however, very desirable that the student should know what constitute the principal duties of a railroad attorney. . . . The young engineer should, if possible, know something of the legal difficulties to be avoided in the conduct of his own work, and have some idea as to when it will be necessary for him to consult the company's lawyer in order to avoid trouble. . . .

A sufficient foundation should by this time have been established to allow of the profitable consideration of general matters affecting railroad administration. Such, for instance, is the principle of competition and combination, applied generally, as well as to railroads; but it should be pointed out that the operation of competition and combination is different in the case of railroads on the one hand and of general business on the other. The several kinds of monopoly may be referred to and commented upon. The methods adopted by railroads to avoid the evils of competition should be carefully looked into, and this should lead to a discussion of railroad associations and railroad pools. . . . The methods

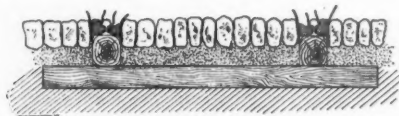
adopted in making rates, partly in classification, have also led to discriminations of various kinds; and it is upon the matter of discrimination that public interest in railroad affairs has very largely centered. It readily can be, and it should be, shown that railroad profits are not on the average too great; that railroad charges are not in this country too high, and that the widespread dissatisfaction which has at times been prevalent has been due to discrimination of some sort.

The Interstate Commerce Act should be made the subject of careful and detailed study, and attention should be called to the evils which led to its passage, to the provisions by which those evils were sought to be remedied, and, also, to other provisions adopted for the purpose of rendering the act practically effective. The observed effects of the law in various ways may also be discussed to advantage.

The course of instruction in Railroad Management above outlined is essentially the one given to students at the Massachusetts Institute of Technology, and has been primarily arranged with a view to the needs of young men whose future will be identified with railroad work. Railroad administration furnishes abundant opportunities for any well educated young man to exercise all the ability which nature and training have placed at his disposal, and a technical training is without doubt the best foundation upon which to build in anticipation of entering the service of any of our successful railroads. But the importance of the relation of railroads to the State, which is becoming more evident almost day by day, furnishes a reason why a course differing little from the above might with propriety be looked upon as a useful part of a liberal training in colleges where instruction in technical engineering finds no place.

A Track Detail.

In laying track through city streets much difficulty is frequently experienced in keeping the paving stones that butt against the rails in place. In order to overcome this difficulty, a strip of wood is sometimes used as a filler, but where the wagon traffic is heavy this wears out rapidly. The following method of overcoming this difficulty is now being tried on one of our larger roads.



Heavy paper is laid against the surface of the rail and the paving stones as shown by the heavy line in the accompanying cut, or else these surfaces are covered with a very thick coating of grease. The space is then cut up into short sections by paper diaphragms and these sections filled in with a good cement concrete made with small broken stone, which is then well rammed. The concrete blocks take the form of the rail perfectly and can be removed and replaced without difficulty in case of repairs to the track.

TECHNICAL.

Manufacturing and Business.

Mr. A. Hegewisch, President of the United States Rolling Stock Co., was on Nov. 21 appointed Receiver of all the properties and effects of the company by the Circuit Court of the United States. All transactions hereafter will be had and conducted in the name of such Receiver. This action, it is announced, has not been taken because of an insolvency of the company, but simply by reason of the difficulty experienced in making collections during the present stringency of the money market. The assets are more than abundant to pay everybody within a short time.

The Moomaw Automatic Car Coupler Co. has been organized at Pensacola, Fla., with a capital stock of \$50,000, to manufacture the car coupler patented by H. E. Moomaw.

The Beaumont Car Works has been incorporated at Beaumont, Tex., by J. C. Moulton, of Laconia, N. H.; G. F. Nickerson, of Boston, Mass.; J. M. Lunt, of Boston, and others.

The abandoned plant of the Norway Steel & Iron Co. at South Boston, covering several acres of ground, has been partly bought by the West End Street Railway Co., which will erect extensive car shops, etc., and utilize several of the old shops formerly used by the Norway company.

The St. Louis Car Coupler Co. was organized recently at St. Louis, Mo., with a capital of \$2,000,000 to manufacture the St. Louis solid steel coupler. The coupler will be made by the St. Louis Steel Foundry Co. from a special brand of steel known as the "Howard brand." The office of the company is at Fifth and Chestnut streets, St. Louis. The directors of the new company are: Henry O'Hara, George A. Bannantine, Edward F. Galtra, William V. Wolcott, T. W. McManus, Jas. W. Givens and J. F. Wangler. W. V. Wolcott is President.

An Iron Propeller Launched.

The iron propeller "Washington," building for the Norfolk & Washington Steamboat Co., was launched at the Harlan & Hollingsworth Co.'s yard Nov. 22. The boat is the first of two vessels to be finished and ready for service between Washington and Norfolk by next spring. She is 200 ft. over all, 37 ft. beam, 16½ ft. hold, and will be fitted with triple expansion engines.

Chimney Draft—Facts and Theories.

A paper on the above subject was read at the last meeting of the Am. Soc. Mech. Eng. at Richmond by Prof. R. H. Thurston. It embodied the results of numerous experiments made by Messrs. W. S. Monroe and E. C. Fisher, with a view to ascertaining how closely the accepted mathematical deductions of Rankine and other engineering writers accorded with actual results shown by direct experiment. The conclusions arrived at from the data obtained were: (1) That the resistances and pressure-differences in the chimney are lower than those computed from the temperature variations by the usual method; (2) that the delivery is greater, with a given resistance, than is thus computed; (3) that the tempera-

ture of maximum delivery is a variable quantity; (4) that the chimney-temperature of maximum delivery is far above that ordinarily taken as that of good practice in the operation of the steam boiler.

The formula given by Rankine is inaccurate in form. The coefficient G , taken as a measure of the fuel bed resistance and assumed to be a constant, is probably a variable of wide range of value.

A Cotton Transport with Steel Hull.

The "Appalachee," a steel steamer built for the Plant Investment Co. by Sweeney & Sons, of Wheeling, W. Va., was launched at that place last week. The boat is to be used in connection with the Savannah, Florida & Western on the Chattahoochee River as a cotton transport. The novelty of the vessel is in the hull. The steel is covered by oak planks bolted to the steel beams. The beams, braces and deck are of steel, which is used almost entirely in the construction of the vessel and where timber is generally used. The steamer is 135 ft. long, 28 ft. beam, with 26 ft. floor and 4 ft. clear in the hold. She will have two 18-ft. boilers, 42 in. in diameter, and two 12 in. x 5 ft. engines.

"Whale Backs" at West Superior.

The new yard at West Superior launched, on the 15th inst., two steel vessels, one a steamer 262 ft. long and 38 ft. beam and the other a steel barge. Both of these are built on the McDougal plan. Three more barges are on the stocks. The barge launched is intended for the ore trade between this country and Cuba, and it with others to follow it, for the same trade, are built with a length of 262 ft., so as to pass through the Welland canal without being cut in two, as the steamer built at Bay City was. They will run the St. Lawrence rapids until they get to the Lachine canal, as the locks in the St. Lawrence canals above the Lachine are only 300 ft. long.

The North River Bridge.

A meeting of the commissioners of the New York & New Jersey Bridge Company was held Tuesday, Nov. 25. Mr. T. C. Clarke, Chief Engineer, and Mr. Charles B. Bush, Assistant Engineer, presented and explained plans. So far as can be ascertained the proposed New York City terminus of this bridge will be somewhere between 2nd and 4th streets. All the approaches will be by elevated ways. All of the roads entering Jersey City, Newark and Hoboken will reach the Jersey City terminus of the bridge by easy grades. It is estimated that the bridge, station building and approaches can be completed within three years. Stock to the amount of \$15,000,000 and bonds for \$35,000,000 will be issued.

Pneumatic Interlocking at Jersey City.

The Union Switch & Signal Co. has been given the contract for signaling the new road of the Pennsylvania at Jersey City, together with the elevated railroad extending from the ferry slip out to Shanley's Cut, about three miles. Two tracks of that portion of the elevated structure, which consists of an iron bridge, have already been completed, and the earth filling for the portion nearer the terminus and for the train shed and station yard is well under way, and the signaling work will be begun within a few weeks. The electro-pneumatic system will be used, and there will be three towers and a number of 1,200 ft. blocks equipped with electro-pneumatic automatic track circuit block signals.

THE SCRAP HEAP.

Notes.

S. P. Sechrist, publisher and manager of the *Official Railway Equipment Guide*, has moved his office to New York, where the *Guide* will hereafter be published.

The general ticket department of the Boston & Maine has in use a combination stamp for countersigning coupon tickets, which is said to accomplish a material saving of time over the ordinary rubber stamp, used in the usual way. The machine was invented by Mr. C. R. Fry, one of the clerks in the office.

Foreman Whistler and 45 men, engaged in building the bridge across the Susquehanna River for the Harrisburg Terminal Railroad, were arrested at Harrisburg, Pa., Nov. 23 for working on Sunday. The complainant is Alderman Brackenridge, and he claims that he was actuated by complaints from the church people.

The Supreme Court of Texas last week approved a verdict of \$10,000 in favor of C. H. Behee, who had sued the Missouri Pacific for black-listing him; but when Behee's lawyer hunted for his client, to tell him the good news, he found him in jail at New Orleans under a sentence of nine months for obtaining money under false pretenses. He had collected money for a mythical widow of a brakeman who had been killed.

An injunction was granted at Hartford last week on application of the Central New England & Western, restraining the New York & New England from removing a track connecting the two roads, and also restraining the New York & New England from carrying out its notice of refusal to transfer freight business. The New England officials claimed that the discontinuance of the track and traffic is necessitated by the abolition of a grade crossing by which switching facilities are destroyed. The injunction has since been dissolved.

There has been a brief strike of freight train men on the Chicago & Eastern Illinois, various minor grievances being alleged. On Nov. 24 a conductor named John O. Stakeley was arrested on a warrant sworn out by Acting Manager George W. Saul. Stakeley and two other conductors were appointed a committee by the Local Railway Men's Association, of Danville, Ill., to persuade all the conductors and brakemen on the road to quit work until the differences between the men and Trainmaster Bowman, of Danville, had been settled. The complaint charges the men with intimidation and preventing a railroad company from transacting its business, in violation of section 109, chapter 153, of the laws of Illinois.

A portion of the employees of the Erie who asked for more pay in September have this week made renewed application to the management of the road, voicing the modifications of the same demands that have been evolved during the past two months. The officers have, however, shown still stronger arguments in support of their claim that the financial condition of the company will not warrant an increase of pay, and the men have apparently gone home satisfied that their claim cannot be pressed. The remarkable statement of the Erie officers showing that wages on that road were in nearly all cases higher than those paid on other roads in the same territory, has not been challenged at any point.

Employees of the Lake Erie & Western have made a demand for a general increase of wages, and it appears a few of them struck. The demand was made on behalf of all classes of employees. The general manager was

unwilling to negotiate with the delegation as representing the whole service. He was willing, however, to receive the different classes separately, and to make proper adjustment of real grievances. The New York, Chicago & St. Louis has, after a conference, raised the pay of trainmen; the different grades being increased from 10 to 50 cents a day. The Michigan Central has increased the wages of through passenger conductors from \$100 to \$110 a month, and of brakemen on the same trains from \$40 to \$50.

The Great Northern Docks at Superior.

Plans are being drawn for extensive terminal improvements at Superior, Wis., by the Eastern Minnesota. The Great Northern's business in connection with the Northern Steamship Co. has demanded increased facilities, and docks No. 5 and No. 6 will be extended about 1,000 ft. to the dock line. It is also intended to cover No. 6 for use as a warehouse for general merchandise, and to enlarge No. 3 and build on it additional flour sheds.

Railroads at the Cape of Good Hope.

In 1873 the government of the Cape Colony took over 63½ miles of railroad then constructed in the colony, and from that time until the end of 1889, when the colony owned 1,560½ miles, the construction progressed continuously. But from then until last year, when nine miles were built, there was no further construction. All of these roads, as well as about 175 miles of road owned by companies, are of 3 ft. 6 in. gauge. The accounts of the government roads for 1873, when the road from Cape Town north (commenced in 1859 and since extended to Kimberley) was taken over by the government, and for last year are given below:

	1873.	1889.
Miles open.....	63	1,608
Capital invested.....	\$273,848	\$14,282,765
Earnings.....	65,605	1,759,832
" per mile open.....	1,034	1,099
" per train mile.....	3s. 9d.	7s. 4d.
Net receipts.....	\$22,928	\$222,129
" per mile open.....	361	514
" per train mile.....	3s. 4.7d.	3s. 5.1d.
" per cent. of capital.....	\$2 12s. 6d.	\$5 15s. 1d.
No. of passengers.....	436,512	3,259,590
Tonnage of goods.....	66,328	521,671
Train miles.....	135,176	4,798,070

The earnings, as seen above, were 5.75 per cent. on the capital expended, but they were a little over 6 per cent. (\$8 10d.) on the outstanding indebtedness, so that they contributed \$266,533 towards the general revenues of the colony. No mention is made of the freight rates, but as the government announces its intention to reduce second rate freights for long distances that are to enter the Orange Free State to 2.4d. per ton mile when the convention with that state becomes operative, they are probably rather high.

Doesn't "Commish."

Our Railroad Commission doesn't seem to commish worth a cent. They promulgated an order to take effect Sept. 8, reducing the fare on the Charlotte Harbor Division, but you pay your little five cents a mile just the same. Was this intended merely as a little piece of merriment? Possibly so, but merriment of this kind comes too high—give us something cheaper.—*Courier Informant, Bartow, Fla.*

Texas Discovers the Angle Splice Joint.

The Southern Pacific Co. to-day inaugurated an innovation in track repairing in Texas. The old-fashioned fish-plate is being removed and is being substituted by what is known as the angle bar, a comparatively recent invention in railway construction, the use of which reduces the chances of accident to the minimum by preventing the spread and "creep" of rails. The angle bar will be placed on the entire Atlantic system.—*A San Antonio press dispatch.*

Iron Notes.

The anomalous relations between the prices of pig and finished irons which have lately been so marked a feature of our market still continue. Sales of good Bessemer pig in Ohio is reported at better than \$16 and \$17, while at Pittsburgh "neutral mill" is selling at \$15 to \$15.25, as against \$18 to \$18.50 in January, and muck bar is only about 50 cents cheaper now than then, though it was nearly \$3 cheaper in June. At the same time melting for foundry purposes is reported to be progressing on a larger scale than ever before. The only explanation seems to be that our blast furnace capacity has increased faster than our rolling mill capacity, or, in other words, that in the South where the great gain in pig iron production has taken place they are still satisfied to ship this production to other localities for advancement in manufacture, and the other localities have not prepared for the additional business.

The furnace capacity returns of the American Manufacturer for Nov. 1 show "that we had probably produced about 15,000 tons more iron at the end of October than our total production of last year; which it will be remembered showed a gain of 17 per cent. on the production of 1888, and the total product of the three years mentioned has probably gone into domestic consumption, as for the time mentioned our exports of iron and steel have nearly balanced our imports."

The Lake ore traffic is drawing to a close with probable shipments of between 8,200,000 and 8,300,000 tons. It was hoped in the spring that the shipments by water would aggregate 9,000,000 tons for the season, but it will require the aid of railroad transportation to bring the season's shipments up to that figure.

Lake Ore Shipments by Railroad.

Owing to a lack of cars and other causes the iron ore miners on Lake Superior have not been able to forward the 9,000,000 tons of ore to market that they expected to ship before the close of navigation, and there is a very good prospect of heavy shipments of the hard Marquette ores by railroad. The amount of railroad ore shipped during the winter months to Chicago is continually increasing, and for some time considerable quantities have been carried by railroads throughout the year for fettling in puddling furnaces; but in view of the demand for ore it is hoped that shipments will be made by rail to east of Pittsburgh this winter. This hope is based on the shortages of lake borne coal shipments to the head of Lake Superior through the season, caused by lack of rollingstock and the desire of railroad managers to secure a large traffic even at a low rate.

How it Works.

An example of one of the beautifully simple ways of cutting rates and the difficulty of restoring them is given in the following: Chicago, Nov. 15. Chairman Finley has evidence that rates from St. Paul to Chicago have been cut to \$9, a reduction of \$2.50 from the regular rate. The trouble, it appears, arises from the sale of a block of 4,000 tickets by the Chicago, St. Paul & Kansas City road to

a broker when cut rates were in vogue. The road cannot redeem them, as they were sold outright, not placed on sale with the broker. If Mr. Finley orders a cut below the point of profit for the broker the latter can simply lock the tickets up and wait till rates are restored, when he can again bring them out."

Bridge Accidents.

On Saturday night, Nov. 24, the middle span of the bridge of the Chicago & Northwestern over the Baraboo River near Baraboo, Wis., gave way, precipitating 24 cars of a freight train into the river.

On Nov. 21 a heavy consolidation engine of the Baltimore & Ohio, standing at the passenger station at Wheeling, W. Va., fell, with a baggage car, into Wheeling Creek, and was entirely submerged, three men going down in the wreck, but escaping with slight injuries. This station is close to the creek, and the train shed extends over the bridge; and the engine was upon the middle of one of the spans. The bridge was built in 1852. In 1887 the single pier settled at one side, and blocks were placed under one chord of the bridge to keep it level.

Train Accident in Turkey.

A dispatch from Salonica, Nov. 15, says: A train from Askub, on which were many soldiers whose terms of service had expired, and who were on their way to their homes, was wrecked near here. Thirty persons were killed and 40 injured. The accident was caused by the washing out of the track by recent heavy rains.

Rapid Transit in Philadelphia.

The Committee on Plans of the Philadelphia Rapid Transit Association has reported favoring an elevated road on Market street from the Delaware River to within 500 ft. of the county line, and has submitted the draft of an ordinance to be presented to Councils, authorizing the Director of Public Works to advertise for bids to erect and operate the road.

The Lake Street Elevated in Chicago.

At last an ordinance has been passed granting certain right of way for this road. As finally passed the ordinance was amended by the Mayor, and, therefore, it is assumed that it will not be vetoed.

LOCOMOTIVE BUILDING.

The Baldwin Locomotive Works have completed the order for eight engines for the Mexican National placed with them some months ago. One of these engines is a compound.

The Rhode Island Locomotive Works are building a large passenger engine with cylinders arranged similar to those of the compound Forney recently built for the Brooklyn-Union elevated road. The driving wheels of the engine are 6 ft. 6 in. in diameter, and the cylinders are 18 and 28 diameter by 24-in. stroke. The engine will probably be out of the erecting shop in about a week.

The Rhode Island Locomotive Works shipped last week a six-wheel switching engine with 18 x 24-in. cylinders and 50-in. driving wheels to the Ohio & Mississippi. The locomotive was the last of a lot of five. Locomotives are now being shipped every few days for the Union Pacific. They are 10-wheel locomotives with 19 x 24-in. cylinders, 62-in. driving wheels and weigh about 130,000 lbs. Fifty-four engines were ordered by the company.

The Chicago & Eastern Illinois placed an order this week with the Baldwin Locomotive Works for eight engines to be delivered before January, 1891.

CAR BUILDING.

The Chesapeake & Ohio has just contracted with the Barney & Smith Manufacturing Co. for a number of elegant passenger cars for the vestibule trains running between Cincinnati and New York. They will be fitted with the Pintsch gas system and the safety steam heating appliances.

Only 250 sets of the Boyden brake have been ordered for the new cars of the Jacksonville Southeastern line, referred to two weeks ago. These brakes will be for the box cars. The other 250 cars are coal cars, and are not to have air brakes.

BRIDGE BUILDING.

Alexandria, Ga.—The Rapides Bridge Co., Ltd., has been incorporated at Alexandria, to construct a bridge over the Red River. B. Turner is President and G. W. Bolton Secretary.

Arkport, N. Y.—It is stated that a new iron bridge is to be erected at this place.

Chicago.—The Kenwood Bridge Co. has completed its main factory building at Grand Crossing. Seventy-fifth street, and has commenced the construction of bridges.

Cleburne, Tex.—The Cable Bridge Co. has been awarded a contract for the construction of a bridge over West Buffalo River, to cost \$1,950.

Dardanelle, Ark.—The Dardanelle Pontoon Bridge & Turnpike Co. has been incorporated, with a capital stock of \$10,000, to build a pontoon bridge over the Arkansas River at that place. Preston Roberts is President.

Dayton, O.—A new bridge is to be built over the Keowee street canal in Dayton.

Des Moines, Ia.—Proposals will probably be wanted in a few days for the proposed bridge at Walnut street, as the plans which are being prepared by City Engineer Schreiner are almost completed.

Ellington, Conn.—The New York & New England will erect a new bridge at Sadd's Mill.

Glasgow, Va.—The South Glasgow Cement & Development Co., Glasgow, recently organized with a capital stock of \$400,000, proposes to construct an iron bridge over the James River.

Harrisburg, Pa.—Work on the new bridge of the Philadelphia, Harrisburg & Pittsburgh Railroad, which crosses the Susquehanna River at Harrisburg, is proceeding rapidly. Cofrode & Saylor, of Pottstown, Pa., the contractors, have eight spans already in place on the eastern end. The bridge consists of 23 spans of about 160 ft. each, a total of 3,880 ft.

Knoxville, Tenn.—A contract has been let for the construction of a bridge over Fifth Avenue at Knoxville, to cost \$15,000.

La Crosse, Wis.—The 300-ft. span of the new highway bridge across the Mississippi River is completed, and work has been commenced on the draw, which has a total length of 420 ft. It is expected that it will be completed in ten days.

Macon, Ga.—The Bibb County Commissioners have ordered that a bridge be erected over the Vineville branch at the foot of Jefferson street, this city.

Montreal, Que.—Messrs. George W. Parent, Alexander Lapierre, Edouard Lalonde, Joseph Brunnette and Eugene Maufette, all of Montreal, will soon apply for letters of incorporation in Canada with a capital stock of \$25,000, for the purpose of constructing iron bridges.

Newcastle, Va.—The Junction City Land & Improvement Co., of Newcastle, Va., proposes to build a bridge across Craig's Creek, and invites bids for its construction.

Orange, N. J.—The Road Board, of Orange, N. J., has instructed the City Engineer to prepare plans for a bridge over Bloomfield avenue.

Philadelphia, Pa.—Work has been begun on the construction of a large bridge connecting the Chestnut and Market street bridges.

Utica, N. Y.—The Dean & Westbrook Co. and the Hilton Bridge Co. have been authorized to prepare plans and estimates for a new bridge across the Erie Canal and Genesee street, referred to last week.

Willimansett, Mass.—The following proposals were received by the County Commissioners of Hampden County, Mass., for building the masonry and foundations of a bridge over the Connecticut River at Willimansett, in accordance with the plans and specifications prepared by their engineer, Edward S. Shaw, of Boston.

BIDDERS.	Pier masonry, 1,900 cu. yds.	Abutment masonry, 1,250 cu. yds.	Wing-wall masonry, 1,600 cu. yds.	Pier foundations, 225 cu. yds.	Excavation, 3,600 cu. yds.	Riprap, 750 cu. yds.	Total amount of bids.
Wright Lyons & Co., Springfield, Mass.	13.0	10.0	7.0	27.0	0.30	1.50	58,120
Flynt Building and Constructing Co., Palmer, Mass.	13.5	9.5	7.25	28.0	0.30	2.00	59,505
John F. Dolan & Co., Elizabeth, N. J.	17.0	11.0	8.50	14.0	0.65	5.00	69,340
J. H. Leavitt, Boston, Mass.	16.5	15.0	12.0	15.0	1.00	3.00	78,825
Moulton O'Mahoney & Trumbull, Boston.	19.97	13.70	9.90	25.0	0.30	3.00	81,183
Wm. H. Ward, Lowell, Mass.	20.0	15.0	9.0	20.0	1.20	3.00	82,700
J. T. Tank, Providence, R. I.	21.0	14.0	9.0	40.0	0.50	3.00	86,950
Geo. M. Atkins & Co., Palmer, Mass.	24.0	18.0	13.0	25.0	1.00	3.00	101,375
G. L. Bosworth & Co., Holyoke, Mass.	28.5	21.0	12.35	31.5	0.75	7.00	116,637

The contract was awarded to Wright Lyons & Co.

RAILROAD LAW—NOTES OF DECISIONS.

Carriage of Goods and Injuries to Property.

In North Carolina the Supreme Court rules that the plaintiff allowing a steer to stray from home, and upon defendant's track, was not such negligence as will bar recovery.¹

In Arkansas it is held by the Supreme Court that the state statutes providing that if any "hiringling" shall willfully set fire to any woods, etc., so as to occasion damage to any other person, with the consent or by the command of his employer, such employer shall be liable, refers to the servants of a railroad company, but not to independent contractors.²

In North Carolina, in an action against a railroad for the destruction of a portable steam engine which had become stalled at a crossing on defendant's road, it appeared that plaintiff's driver, on seeing a train turn a curve about 1,000 yards distant, ran up the track waving a handkerchief; that the engineer made no effort to stop the train until within 300 or 350 yards of the crossing, though he noticed the signal as soon as he turned the curve, and though his fireman called his attention to the obstruction when the train was 600 yds. from the crossing; and that the engine could be stopped in 350 yds. The Supreme Court holds the railroad liable if the engineer saw that plaintiff's engine was stalled.³

In Mississippi the Supreme Court holds that an injury caused by fire communicated by a train is an injury "inflicted by the running of the locomotives or cars" of a railroad company, within the meaning of Code Miss. § 1059, making proof of such an injury *prima facie* evidence of negligence.⁴

In Indiana the Supreme Court rules that an abutting land-owner cannot recover nominal damages for the occupation of a street by a railroad, but only for damages actually sustained.⁵

In California it is held by the Supreme Court that in an action against a railroad company for damages for the occupation of a street, one-half of the fee of which is in plaintiff, the latter is entitled to recover the value of his interest in the street taken, subject to the easement for a public street.⁶

In Michigan in an action for killing a cow, plaintiff's testimony showed that he drove his cows across defendant's railroad track, and paid no further attention to them, though he knew that the track was not fenced; that at the time of the accident plaintiff was about 70 rods distant, and that the cow entered on defendant's grounds at a place where it was not required to maintain a fence. The Supreme Court rules that the plaintiff was guilty of negligence and could not recover.⁷

In Wisconsin, after a town plot had been laid out, a railroad removed its fences from the track, and put in cattle guards. It had for a long time maintained a flag station there and a side track, but had no depot master or clerk, and took up freight when flagged, as it did on any other point on that portion of the road. No tickets were sold to the town, which consisted of two houses and the store. The Supreme Court holds that these were not "depot grounds," so as to exempt the railroad company for liability for horses killed there for want of a fence.⁸

In Mississippi, in an action for killing a mule, it was shown that no alarm was given by the engineer. The evidence for defendant was that it was nearly dark at the time of the accident, that the head-light of the engine had been lighted a short time before; that the

whistle blew and the bell was rung for the road crossing; that only the fireman saw the mule, and he did not have time to call the attention of the engineer to it till too late to prevent striking him; and that the train was long and heavy, going down grade and running very rapidly, and could not have been stopped if the attempt had been made when the mule was first seen. The Supreme Court holds the railroad not liable.⁹

The Supreme Court of Washington rules that under the statute of 1883, providing that every railroad company "owning or operating lines of railway within the territory" shall be liable for all live stock killed by its trains, the company is liable whether it owns or operates the road; and, in the latter case, it is immaterial that the road is leased.¹⁰

Injuries to Passengers, Employees and Strangers.

The Supreme Court in Wisconsin rules that in an action for injuries sustained by a passenger, the train being thrown from the track owing to a broken rail, it is error to permit plaintiff to introduce in evidence pieces of the broken rail, picked up after they had been exposed to the weather for six months after the accident, and to permit the jurors to draw a conclusion as to the soundness or unsoundness of the rail therefrom.¹¹

In Georgia a railroad embankment which had stood for 30 years, without any difficulty occurring at that point, gave way after a sudden and unprecedented rainfall, causing injuries to plaintiff. The roadmaster had sent men to a point two miles off, where trouble might be apprehended. The rainfall occurred within two hours before the accident. The Supreme Court holds that it was a question of fact for the jury whether or not the company was negligent in not knowing of the washout in time to have warned plaintiff.¹²

In Wisconsin the Supreme Court holds that the state statute which prohibits, in all cities and villages, trains running faster, "until after having passed all the traveled streets thereof," than six miles per hour, makes it unlawful for a train, on entering a city, to run at a greater rate of speed than six miles an hour, though it has not yet arrived at any traveled streets.¹³

In Pennsylvania it is ruled by the Supreme Court that where, in an action against a railroad for death caused by accident, it appears that the deceased ran across the track in front of a passing train, by which he was struck, and that he might have seen and avoided the train had he looked, it is proper to enter a compulsory nonsuit.¹⁴

In Kentucky the Court of Appeals rules that a boy 11 years old, who climbs upon freight cars standing on a side track at a railroad depot, is a trespasser; and the company, not knowing of his presence, is not liable for injuries sustained by him in being thrown from the car by the concussion caused by attaching a train thereto.¹⁵

In Michigan the plaintiff was injured at a railroad crossing, where there were nine tracks, over which trains were passing in both directions all day. He had crossed the tracks daily for years, his place of business being near there, and he knew that it was a dangerous place. One could see two or three hundred feet along the tracks before going on to them. Plaintiff, as it appeared, had crossed seven of the tracks, and reached the eighth, when, as he testified, he "looked up," and saw an engine coming down the track. Continuing to look at this, he stepped back, and was struck by an engine coming in the same direction as the first. The Supreme Court rules that he was guilty of contributory negligence, and that it was proper to direct a verdict for defendant.¹⁶

In the same state a pedestrian attempted to cross defendant's track at a street crossing immediately after a locomotive with some cars attached had passed the crossing and was run over by some other cars which had become detached from the locomotive and were following at a distance of a few feet. The deceased was familiar with railroads and with the crossing. The Supreme Court holds that, although the deceased did not look to see if the other cars were coming, and could have seen them if he had looked, the question of contributory negligence was properly left to the jury.¹⁷

- ¹ Bethen v. R. & A. A. L. R. Co., 10 S. E. Rep. 1045.
- ² St. L. & M. & S. Ry. Co. v. Yonley, 13 S. W. Rep. 333.
- ³ Bullock v. W. & W. R. Co., 10 S. E. Rep. 388.
- ⁴ Louisville, N. O. & T. Ry. Co. v. Natchez, J. & C. R. Co. 7 South Rep. 350.
- ⁵ Burkham v. Ohio & M. Ry. Co. (Ind.), 23 N. E. Rep. 709.
- ⁶ Muller v. South Pac. R. Co., 23 Pac. Rep. 265.
- ⁷ Niemann v. Michigan Cent. R. Co., 44 N. W. Rep. 1,049.
- ⁸ Anderson v. Stewart, 44 N. W. Rep. 1,091.
- ⁹ K. C. M. & B. R. Co. v. Myers, 7 South Rep. 321.
- ¹⁰ Oregon Ry. & Nav. Co. v. Dacres, 23 Pac. Rep. 415.
- ¹¹ Stewart v. Everts (Wis.), 44 N. W. Rep. 1,092.
- ¹² Cent. R. & B. Co. v. Kent, 10 S. E. Rep. 965.
- ¹³ Hooker v. C. M. & St. P. R. Co., 44 N. W. Rep. 1095.
- ¹⁴ Irey v. Pennsylvania R. Co., 19 Atl. Rep. 341.
- ¹⁵ L. & N. R. Co. v. Hurt, 13 S. W. Rep. 275.
- ¹⁶ Gebhard v. D., G. H. & M. R. Co., 44 N. W. Rep. 1045.
- ¹⁷ Brackenfelder v. L. S. & M. S. Ry. Co., 44 N. W. Rep. 967.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago, Burlington & Quincy, quarterly, \$1.25 per share, payable Dec. 15.

Chicago & Northwestern, 1½ per cent. on the preferred stock and 3 per cent. on the common stock, payable Dec. 23.

Northeastern (South Carolina), semi-annual, 3 per cent.

Northern Pacific, quarterly, \$1 per share on the preferred stock, payable Jan. 15.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Atlantic & Danville, annual, Portsmouth, Va., Dec. 11.

Boston & Maine, annual, Boston, Mass., Dec. 6.

Charlotte, Columbia & Augusta, annual, Columbia, S. C., Dec. 4.

Columbia & Greenville, annual, Columbia, S. C., Dec. 4.

Eastern (Mass.), annual, Boston, Mass., Dec. 10.

East Tennessee, Virginia & Georgia, special, Knoxville, Tenn., Dec. 6.

Fort Worth & Denver City, annual, Fort Worth, Tex., Dec. 9.

Keokuk & Western, annual, Keokuk, Ia., Dec. 4.

Lehigh & Hudson River, annual, Warwick, N. Y., Dec. 1.

Middletown & Crawford, annual, Middletown, N. Y., Dec. 2.

New York, New Haven & Hartford, annual, New Haven, Conn., Dec. 17.

Pittsburgh & Connellsville, annual, Smithfield and Water streets, Pittsburgh, Pa., Dec. 1.

Red River, Sabine & Western, annual, Fort Worth, Tex., Dec. 11.

Richmond & Danville, annual, Richmond, Va., Dec. 3.

Richmond & West Point Terminal, annual, Richmond, Va., Dec. 9.
South & North Alabama, annual, Montgomery, Ala., Nov. 20.
Tennessee Midland, annual, Memphis, Tenn., Dec. 3.
Ulster & Delaware, annual, Rondout, N. Y., Dec. 9.
Virginia Midland, annual, Alexandria, Va., Dec. 17.
Walkill Valley, annual, 5 Vanderbilt avenue, New York City, Dec. 10.

Railroad and Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The Southern & Southwestern Railway Club will hold its next meeting in Atlanta, Ga., Jan. 15.

The New England Railroad Club meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.

The Western Railway Club holds regular meetings on the third Tuesday in each month, except June, July and August, at the rooms of the Central Traffic Association in the Rookery Building, Chicago, at 2 p. m.

The New York Railroad Club meets at its rooms, in the Gilsey House, New York City, at 2 p. m., on the third Thursday in each month.

The Central Railway Club meets at the Hotel Iroquois, Buffalo, the fourth Wednesday of January, March, May, September and November.

The Northwest Railroad Club meets on the first Saturday of each month, except June, July and August, in the St. Paul Union Station at 7:30 p. m.

The Northwestern Track and Bridge Association meets on the Friday following the second Wednesday of each month at 7:30 p. m. in the directors' room of the St. Paul Union station, except in the months of July and August.

The American Society of Civil Engineers holds its regular meetings on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street, New York.

The Boston Society of Civil Engineers holds its regular meetings at the American House, Boston, at 7:30 p. m., on the third Wednesday in each month.

The Western Society of Engineers holds its regular meetings at 73 La Salle street, Chicago, at 8 p. m., on the first Wednesday in each month.

The Engineers' Club of St. Louis holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The Engineers' Club of Philadelphia holds regular meetings at the House of the Club, 1,122 Girard street, Philadelphia, on the first and third Saturday, of each month, excepting in January, when the annual meeting is held on the second Saturday of the month. The second January meeting is held on the third Saturday. The club stands adjourned during the months of July, August and September.

The Engineers' Society of Western Pennsylvania holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Penn Building, Pittsburgh, Pa.

The Engineers' Club of Cincinnati holds its regular meetings at 8 p. m. on the third Thursday of each month in the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati.

The Civil Engineers' Club of Cleveland holds regular meetings on the second Tuesday of each month, at 8:00 p. m. in the Case Library Building, Cleveland. Semi-monthly meetings are held on the fourth Tuesday of the month.

The Engineers' Club of Kansas City meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The Engineering Association of the Southwest holds regular meetings on the second Thursday evening of each month at 8 o'clock, at the Association headquarters, Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The Denver Society of Civil Engineers and Architects holds regular meetings at 36 Jacobson Block, Denver, on the second and fourth Tuesday of each month, at 8 o'clock p. m., except during June, July and August, when they are held on the second Tuesday only.

The Civil Engineers' Society of St. Paul meets at St. Paul, Minn., on the first Monday in each month.

The Montana Society of Civil Engineers meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The Civil Engineers Association of Kansas holds regular meetings at Wichita on the second Wednesday of each month, at 7:30 p. m. The annual meeting will be held on the third Wednesday in December.

The American Society of Swedish Engineers holds meetings at the club house, 250 Union street, Brooklyn, N. Y., and at 347 North Ninth street, Philadelphia, on the first Saturday of each month.

Civil Engineering Society of the Massachusetts Institute of Technology.

The twenty-first regular meeting of the Civil Engineering Society of the Massachusetts Institute of Technology was held in Boston Nov. 20. Mr. H. C. Bradley read a paper on the "Erection of Iron Bridges," and C. W. Sherman one upon the "Disposal of Sewage at Worcester, Mass." An informal discussion of the methods of disposing of sewage sludge, the propagation of disease by water, and the uses of chemical filtration closed the meeting.

New York Railroad Club.

A meeting of this club was held in its rooms in the Gilsey House, New York City, Nov. 20. This was the first annual meeting under the reorganization. A constitution and by-laws were adopted, and the following officers were elected: President, Ross Kells; First Vice-President, R. C. Blackall; Second Vice-President, W. L. Hoffecker; Third Vice-President, Frank S. Gannon; Secretary, H. G. Prout; Treasurer, C. A. Smith. Executive Committee: John S. Lentz, William Buchanan, W. H. Lewis, H. S. Hayward, Thomas Aldcorn. Finance Committee: E. H. Address, J. H. Bailey, S. W. McMunn.

PERSONAL.

—Mr. Charles Francis Adams, who has been President of the Union Pacific since June, 1884, will resign that position at a meeting of the stockholders in Boston, Nov. 26.

—Mr. D. H. Nichols, formerly General Superintendent of the St. Louis & San Francisco, and who resigned last May, has accepted a position as Division Superintendent on the New York & New England.

—Mr. James P. Whitney, General Auditor of the Chicago, Milwaukee & St. Paul, is to be retired on half pay at the same time with Mr. Carpenter, General Ticket

and Passenger Agent. His successor will be Mr. W. N. D. Winne, now Assistant General Auditor.

—Judge Cooley, Chairman of the Interstate Commerce Commission, has been obliged to retire to his home at Ann Arbor, Mich., for rest. His health has again become precarious. It is said that he stood the journey from Washington to Ann Arbor well and that his associate commissioners do not feel alarmed about his health.

—Mr. George Bernard, who has been Purchasing Agent and Assistant Treasurer of the Mexican National since 1887, died in New York city last Friday. He was born in Philadelphia in 1855, and had been connected with the Mexican National for a number of years, having first entered its employ as clerk.

—Mr. Warren G. Elliott, President of the Wilmington & Weldon and other roads of the Atlantic Coast Line, was elected President of the Petersburg road, one of the other lines in the system at the annual meeting last week. He succeeds Col. John D. Palmer, who has resigned on account of ill-health and who is now in Europe.

—Mr. J. L. Moore, General Manager and Treasurer of the Cincinnati, Sandusky & Cleveland, is to retire from those positions on Dec. 1, when the lease to the Cleveland, Cincinnati, Chicago & St. Louis becomes effective. It is not known whether Mr. Moore is to remain with the company in another capacity, or whether he will retire altogether from railroad service.

—Mr. George H. Baker, formerly with the Chicago, Burlington & Quincy, who went to Montevideo, Uruguay, as Master Mechanic of the Eastern Railroads of Uruguay, has resigned that position, to take effect Jan. 1, 1891. He will return to the United States at once thereafter. The company has been unable to even begin construction, and there is up to the present no sign of its beginning.

—Mr. E. B. Thomas, Second Vice-President of the New York, Lake Erie & Western, has been appointed First Vice-President to succeed Mr. S. M. Felton, Jr. Mr. Thomas has been Vice-President of the Erie since Jan. 1, 1888, and previous to that time was Vice-President of the New York, Pennsylvania & Ohio for a short period. His long service on the "Bee Line" and Richmond & Danville is well known.

—Maj. Sherman Conant, Superintendent of the Florida Southern Division of the Jacksonville, Tampa & Key West, died at Palatka, Fla., last week, of pneumonia. He had been sick only a week and his death was unexpected. Maj. Sherman was about 50 years old and had been in the railroad service for the last 18 years. He had been General Manager and Superintendent of the Florida Southern since Jan. 1, 1883. He had previously been General Manager and Receiver of the Jacksonville, Pensacola & Mobile.

—Mr. William Robinson, Michigan and Southwestern Passenger Agent of the Grand Trunk, died at Lapeer, Mich., last week. Mr. Robinson was on his way from Detroit to Bay City and had stopped off at one of the stations. On attempting to re-enter the car he slipped and his leg was caught under the car wheel and crushed below the knee. Amputation was found necessary, but Mr. Robinson never rallied from the shock. He was about 40 years old, and had been passenger agent of the Grand Trunk since 1882.

—Mr. A. A. Jackson, General Superintendent of the New York & New England, resigned this week. No successor to Mr. Jackson will be appointed. Mr. R. E. Evenson, Division Superintendent, will perform part of Mr. Jackson's duties with the title Superintendent of Transportation. Mr. Jackson is now about 60 years old, and entered the railroad service as early as 1854 as a freight brakeman. He had held positions as Station Agent, Clerk, Dispatcher and Train Master when he was appointed Superintendent of the Allegheny Valley Road in 1885. Since January, 1887 he has been Assistant to the Vice-President of the New York & New England, and General Superintendent for the last two years and a half.

—At his own request, on account of his physical infirmity, Mr. Albert Von Haller Carpenter is to retire from his position at the head of the General Passenger & Ticket Department of the Chicago, Milwaukee & St. Paul road. Mr. Carpenter was born in Middlesex, Vt., Nov. 1, 1822. He entered the railroad service as a freight conductor on the Vermont Central in June, 1849. In March, 1856, he entered the service of the Milwaukee & Chicago road, now part of the Chicago, Milwaukee & St. Paul, as Superintendent's clerk, Secretary and Treasurer. In 1862 he became General Ticket Agent of the Chicago & St. Paul, and Jan. 1, 1886, he was appointed General Ticket and Passenger Agent of the Milwaukee & St. Paul, and was later appointed to the same position on its successor, the Chicago, Milwaukee & St. Paul. Mr. Carpenter has been afflicted with increasing blindness for several years. For the past year he has been totally blind, but has remained at the head of the department. The Board of Directors have retired him on half pay for life, with the understanding that he shall consider himself connected with the company in an advisory capacity, but that, unless he chooses, nothing will be required of him. George H. Heafford, now First Assistant General Passenger Agent of the Chicago, Milwaukee & St. Paul, will succeed Mr. Carpenter.

—Mr. Samuel M. Felton, Jr., who has been First Vice-President of the New York, Lake Erie & Western, in charge of the traffic and operating departments for the last five years, was this week elected President of the East Tennessee, Virginia & Georgia system. He succeeds Mr. Samuel Thomas, who becomes Chairman of the Board of Directors. Mr. Felton was born in Philadelphia in 1853, and is the oldest son of the late Samuel M. Felton, formerly President of the Philadelphia, Wilmington & Baltimore, and who was, for so many years, a prominent figure in railroad matters. Mr. Felton educated his son as a civil engineer and his first railroad experience was as a rodman on a small road in Pennsylvania, in 1868. He served in the various positions of an engineer's party until he became Chief Engineer of the Chester and Delaware River road in 1873. Mr. Felton was for eight years, up to January, 1882, General Superintendent of the Pittsburgh, Cincinnati & St. Louis, and was General Manager of the New York & New England between January, 1882 and February 1884. In the latter year he became connected with the New York, Lake Erie & Western and he has remained in its service continually up to the present time. His offices have been Assistant to the President, in charge of the New York, Pennsylvania & Ohio, General Manager of the latter road, and Vice President of the Erie in charge of the traffic department; he has also had charge of the operating department since October, 1888.

ELECTIONS AND APPOINTMENTS.

Annapolis & Baltimore Short Line.—The stockholders held their annual meeting at Baltimore, Md., last week, and elected the following directors: J. S. Ricker, W. W. Brown, W. C. Haskins, J. Hopkins Smith, John Glenn, George Burnham, Jr., F. E. Fennessy, C. A. Coombs and Joseph B. Seth. The directors elected J. S. Ricker, President; J. Hopkins Smith, Vice-President; C. A. Coombs, Manager and Director, and L. A. Burck, Secretary and Treasurer.

Chicago, Burlington & Quincy.—Phillip Wallis has been appointed Master Mechanic at Creston, Ia., vice C. W. Eckerson transferred to Beardstown, Ill.

Chicago, Rock Island & Pacific.—R. H. Chamberlain, Superintendent of the Illinois Division, having been assigned to other and important duties in the service of this company, the following appointments and promotions have been announced, effective on Dec. 1: C. L. Fwing, Superintendent Illinois Division, with headquarters at Chicago, and H. A. White, Superintendent Southwestern Division, with headquarters at Trenton, Mo.

Chicago, St. Paul, Minneapolis & Omaha.—John Merry has been appointed Roadmaster to succeed W. T. Payne, resigned to enter the service of the Northern Pacific.

Duluth Transfer.—The following officers have been elected: A. Harrington, President; C. E. Lovett, Vice-President; D. H. Merritt, Treasurer; O. H. Simons, Secretary; H. P. Johnston, General Superintendent, and F. J. Felter, Chief Engineer. The office of the company is at the Spalding House, Duluth, Minn.

East Tennessee, Virginia & Georgia.—The directors have organized by electing S. M. Felton, Jr., President; Calvin S. Brice and Henry Fink, Vice-Presidents; L. M. Schwan, Secretary, and J. Neil Mitchell, Treasurer. The office of Chairman of the Board has been created and Gen. Samuel Thomas chosen for the place. The chairman will take charge of the financial affairs of the property, while the president will manage the operating departments and will make his headquarters at some point on the line of the road.

European & North American.—At the annual meeting of the company at Bangor, Me., recently, the following directors were elected: N. C. Ayer, Sprague Adams, C. F. Bragg, W. H. Strickland, F. A. Wilson, C. M. Stewart, Hon. A. D. Manson and C. P. Stetson. Charles P. Stetson was elected President and A. T. Thompson, Treasurer.

Franklin & Megantic.—The following directors were elected at the annual meeting at Kingfield, Me.: V. B. Mead, P. H. Stubbs, John Winter, N. B. Bryant, Orren Tufts, S. W. Sargent and W. S. Heath. Officers were elected as follows: V. B. Mead, President; F. S. Mead, Superintendent, and P. H. Stubbs, Treasurer and Clerk.

Georgia Pacific.—Capt. John D. Patterson has been appointed Assistant Master of Trains of this division of the Richmond & Danville system, with headquarters at Birmingham, Ala.

Great Northern.—A. H. Hogeland has been appointed Engineer of Maintenance of Way, with headquarters at St. Paul.

Louisville & Nashville.—Judge Wood, of Evansville, Ind., has been appointed Third Vice-President of the company, with headquarters at Nashville, Tenn., vice E. B. Stahlman, resigned.

Missouri Pacific.—Albert Marsh has been appointed Superintendent, with jurisdiction over the main line from Sedalia to Kansas City, Mo., the Lexington branch, the Jefferson City, Booneville & Lexington branch and the Sedalia, Warsaw & Southern division, to succeed Mr. Meade Stillwell, who recently resigned. His headquarters will be at Sedalia, Mo.

H. S. Priest, formerly Attorney for Missouri on the Wabash road, has been appointed General Attorney of this company for Missouri, with headquarters at St. Louis, vice T. J. Portis, now Consulting Attorney.

Montgomery & Eufaula.—The following board of directors was re-elected at the last annual meeting held at Montgomery, Ala.: J. W. Tullis, G. L. Colner and J. H. Dent, Eufaula; W. M. Stakely, Jr., Union Springs; I. Pollak, Chas. A. Stern and J. H. Warren, Montgomery, and Cecil Gabbett, of Savannah, Ga. The board elected Gen. E. P. Alexander president and Cecil Gabbett General Manager.

New York & Canadian Pacific.—The stockholders of this new company met at Albany, N. Y., Nov. 20, and elected directors as follows: Henry Russell, W. L. M. Phelps, John W. Van Valkenburgh, Timothy J. Sullivan and John W. McNamara, Albany; George H. Wooster and William S. Carman, New York; Minard Harder, Cobleskill; Charles H. Ramsey and Joseph H. Ramsey, Howe's Cave; Jacob G. Runkle, Central Bridge; Joshua L. Chamberlain and Lewis Coleman, Boston, Mass. The officers selected were: President, Joseph H. Ramsey; Secretary, William L. M. Phelps; Treasurer, William S. Carman.

New York, Lake Erie & Western.—The annual meeting of the stockholders of the company was held in New York, Nov. 24. The regular ticket for directors was elected as follows: John King, John G. McCullough, Ogden Mills, J. Lowber Welsh, William Whitewright, William A. Wheelock, Henry H. Cook, George W. Quintard, William Libbey, Cortlandt Parker, Morris K. Jesup, James J. Goodwin, William L. Strong, William N. Gilchrist, Josiah Belden, M. F. Reynolds and E. B. Thomas. The Mills-McCullough Committee voted on 238,000 shares of common and preferred stock \$24,200,000 of bonds, and President John King voted on 238,000 shares of stock and \$6,200,000 bonds. The only change from the old board is the retirement of S. M. Felton, Jr., and the election of E. B. Thomas to succeed him. Subsequently the board met, re-elected John King President and A. R. MacDonough Secretary, and elected Mr. Thomas First Vice-President of the company. The office of Second Vice-President was not filled.

New York & New England.—A. A. Jackson, of Boston, the General Superintendent, has resigned his position, to take effect Dec. 1. R. E. Evenson, Superintendent of the eastern division of the road, has been promoted to the position of Superintendent of Transportation.

New York & Sea Beach.—The Directors elected at the annual meeting held at 56 Wall street, New York City, Nov. 25, are: A. P. Man, George Peabody Wetmore, William O. Platt, John Barker, L. C. Lathrop, Alrick H. Man and Charles C. Protherol.

Northeastern (South Carolina).—At the annual meeting of the stockholders, held at Charleston, S. C., Nov. 21, the old Board of Directors was re-elected, with the ex-

ception of Warren G. Elliott, of Wilmington, who was chosen in place of Col. J. B. Palmer, resigned.

Northern Pacific.—The office of Assistant General Superintendent of the Western Division is now at Tacoma, Wash., instead of Helena, Mont., as heretofore.

Omaha, Kansas Central & Galveston.—The directors of this company are: Valdemor Sills, Gustav A. Buck, Jacob Newberger and George H. Bailey, of New York, and D. M. Bell, Alonzo Jones and C. M. Rawlings, of Lyons, Kan.

Oregon Improvement Co.—Joseph Simon has been appointed Receiver.

Pennsylvania Company.—H. R. Dering, Assistant General Passenger Agent at Indianapolis, has been transferred to Cincinnati to succeed D. I. Roberts. He will have jurisdiction over the entire territory heretofore included under both the Indianapolis and Cincinnati Assistant General Passenger Agencies. W. F. Brunner will succeed him.

Petersburg.—The following directors were elected at the annual meeting recently held at Richmond, Va.: W. T. Walters, H. Walters, B. F. Newcomer, Fred. R. Scott and Dr. D. W. Lassiter. Warren G. Elliott was elected President to succeed J. B. Palmer, resigned, and H. Walters was elected Vice-President.

Providence, Warren & Bristol.—At the annual meeting in Providence, R. I., Nov. 24, the board of directors was increased to six for the ensuing year. The following were elected directors: Charles F. Choate, Southboro, Mass.; Frederick L. Ames, Easton, Mass.; James C. Church, Bristol, R. I.; William Goddard and Royal C. Taft, Providence; James H. Kenarick, Boston. The board of directors elected the following officers: President, Charles F. Choate; Treasurer, John M. Washburn; Secretary, George L. Greene; General Manager, James R. Kendrick; Superintendent, Isaac N. Marshall.

Richmond, Fredericksburg & Potomac.—W. T. Walters, B. F. Newcomer, M. Robinson, Jr., A. Sidney Biddle and Dr. L. B. Anderson were elected directors at the last annual meeting. E. T. D. Myers was re-elected President.

St. Louis, Arkansas & Texas.—L. F. Day, General Freight Agent at St. Louis, Mo., has been appointed Freight Traffic Manager in charge of the freight traffic affairs of the system. E. W. LaBeaume, General Passenger and Ticket Agent, will have charge of all the passenger affairs.

The office of General Traffic Manager has been abolished. R. M. Galbraith has been appointed Master Mechanic of the Texas division, with headquarters at Tyler, Tex., vice R. W. Savage.

Suspension Bridge and Erie Junction.—The annual meeting, which was held at 21 Cortlandt street, New York City, Nov. 25, resulted in the election of the following as directors: John King, John G. McCullough, Ogden Mills, George W. Quantard, H. H. Cook, William Wheelock, Wm. A. Wheelwright, William Libbey, A. R. MacDonough, A. Donaldson, F. G. Babcock, E. B. Thomas, and George A. Vaillant.

Tilly Foster Mine.—At the annual meeting of the company at 45 Wall street, New York City, Nov. 25, the old Board of Directors was re-elected.

Union Pacific.—T. W. Kennedy has been appointed Assistant Superintendent, with headquarters at Green River, Wyo.

Wabash.—F. W. Lehman of Des Moines, Ia., has been appointed Attorney for Missouri, with headquarters at St. Louis, to succeed H. S. Priest, who has resigned to accept a similar position on the Missouri Pacific.

Waco, Lampasas & Llano.—The incorporators are M. C. Wolfe, Wolfe City, Tex.; George T. Malone, William Ginnuth, E. M. Longcope and W. A. Patterson, of Lampasas; M. A. McLaughlin, of Fort Worth; W. A. H. Miller, F. R. Malone, Duncan T. W. Kellogg and W. S. Dorland, of Llano; Richard Woodley, of San Antonio; F. J. Sample, of Brownwood; Henry Exall, of Dallas; C. E. Longcope, of Philadelphia, Pa.; Thos. F. McClure, Weston, Ohio; John A. Noon, Manhattan, Kan., and C. A. Gilchrist, Fort Madison, Ia.

Wilmington & Weldon.—The following directors were elected at the last annual meeting: W. T. Walters, Michael Jenkins, H. B. Plant, B. F. Newcomer, J. P. McCay, A. J. DeRosset, D. MacRae, E. B. Borden, George Howard and W. H. Willard. Walter G. Elliott was re-elected President; H. Walters, Vice-President, and James F. Post, Jr., Secretary and Treasurer.

Zig Zag.—The officers and directors of this new company are: President, May Chapman; Treasurer, Charles P. Walker; Clerk, E. H. Paine. Directors: May Chapman, Charles P. Chase, Portland; Eva M. Akeroyd, Charles P. Walker, Boston; John H. Humphrey, Yarmouth.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

Alabama Mineral.—The extension from Sylacauga to Shelby, Ala., will be ready for operation early next month. The extension beyond Shelby has been delayed a great deal on account of the heavy work between that point and Calera, where connection is made with the Louisville & Nashville, by which the line is to be operated. The grades on the old Anniston & Atlantic between Boswell and Talladega are being reduced from a maximum of 92 ft. per mile, by a change of location which will also eliminate many of the sharp curves on the present line.

Astoria & South Coast.—Articles of incorporation have been filed in Portland, Or., for the South Coast Construction Co. by D. H. Smith, William Reid and E. T. Johnson. The company is organized for the purpose of completing the unfinished portion of the Astoria & South Coast, both to the Southern Pacific line in Washington County, Or., and to Portland via the Northern Pacific lines near Linden, on the Willamette River. The first 52 miles of the road will be completed by next June, the money for the work having, it is claimed, been raised in London. J. H. Smith, of Portland, is the contractor.

Atlanta & Selma Air Line.—The company have just completed a second and more accurate survey of the line between Atlanta and Selma, Ala., and the estimates and profiles have been made. The company is now negotiating for the funds to build the line and expects to have the arrangements made in a short time. L. E. O'Keefe, of Atlanta, is Secretary and Treasurer.

Bennington & Glastonbury.—This road was sold at auction at Bennington, Vt., Nov. 21, being bid off for \$5,000 by Col. M. S. Colburn, General Manager of the Bennington & Rutland. This sale is subject to various mortgages and comprises eight miles of railroad and 14,000 acres of heavily timbered land.

Baltimore & Drum Point.—The company has taken an appeal from the decision of the Circuit Court of Anne Arundel County, Md., granting an injunction to certain taxpayers to prohibit the County Commissioners from issuing \$200,000 in bonds to the railroad which had been voted at a county election a number of years ago.

Birmingham & Atlantic.—The branch from Renfro, Ala., to the Cook ore mines, in North Alabama, a distance of about 12 miles, was completed last week, and will be open for traffic in a few days.

Bluefield & Princeton.—The Secretary of State of West Virginia has issued a charter to this company to build a road from Bluefield, Mercer County, to Princeton, in the same county about 12 miles. The capital stock is \$200,000, all held by local capitalists interested in the lands it will pass through.

Chattanooga Northern.—The company has several parties of engineers making a survey from a point near Chattanooga up the Tennessee and Church rivers to near Middlesboro, Ky. The survey crosses the Hiwassee River at Burke's Hill, and the Tennessee at James Ferry. The line will also pass through the towns of Cleveland, Kingston and Harriman, Tenn. C. E. James, of Chattanooga is interested.

Chattanooga Southern.—The grading of the road has been completed from Gadsden, Ala., north to the Pigeon Mountain tunnel, and track-laying will begin at once on this section. As soon as the tunnel is opened work will begin on the Chattanooga section.

Chicago, Kansas City & Texas.—The contract for the extension from Smithville, the present terminus, north to Gower, Mo., has been let to Scott & Hinkley, of Smithville. The distance is 17 miles. The survey has been finished to Gower, and is now being made to Pattonsburg, Mo.

Cincinnati, Wabash & Michigan.—The extension from Anderson south to Rushville, Ind., a distance of 39 miles, was completed last week, the last rail being laid near Ovid, about seven miles south of Anderson. The rail has been completed on most of the extension and trains will soon be running between Anderson and Vernon on the Evansville & Richmond Road. Between Anderson and Vernon the tracks of the Cleveland, Cincinnati, Chicago & St. Louis are used.

Corpus Christi and South America.—Griffin Bros. of Minneapolis, who were recently awarded the contract for grading on this road, have put a large force of men at work south of Corpus Christi, Tex. The engineers have made the location for the first section and are now continuing the survey south to the International boundary near Brownsville, Tex., a distance of 100 miles.

Duluth, Red Lake Falls and Northern.—The surveys on this line have reached Leech Lake, en route from Red Lake Falls, Minn., to Duluth. Right of way is now being secured from Warren, Minn., to St. Thomas, N. D. Probably about 80 miles of the road will be graded by spring. It will make the shortest line from North Dakota to Duluth, by 100 miles, of any yet built.

Duluth Transfer.—This company is organized for the purpose of building a transfer or belt line on the northerly side of the Bay of St. Louis at Duluth, Minn., with a view of reaching all the freight receiving and freight producing points of the city, including docks, factories, mills, elevators, etc. It is also the purpose of the company to make connections with all lines of railroad entering Duluth or West Superior and affording them the means of transportation of both freight and passenger trains. The main line of the road will be about 20 miles in length, with branches reaching in every direction. So far about three miles of the track has been laid and the right of way has been acquired for a considerable distance, and construction is being pushed.

Duluth & Winnipeg.—The maps showing the location of the road through the Indian reservations in Northern Minnesota have been approved at Washington, and a council of the Indians of the Winnebagoish has been ordered for the purpose of agreeing upon the price to be paid for right of way.

Edmonds & Eastern.—This company is being organized at Edmonds, Wash., to build a road from Edmonds east. The survey has been made from Edmonds for about 35 miles northeast for a short distance to the middle of the east line of section 19, and thence east through sections 20, 21, 22, 23, and 24 to the east line of township 27, range 5, and crossing the Seattle, Lake Shore & Eastern road at or near Earle. From this point the route is southeasterly to the Snoqualmie River, which will be crossed by a drawbridge. From the river the survey runs northeast through farming country and reaching timber land and coal and other valuable mineral deposits. The total cost of the road, as estimated, will be from \$450,000 to \$500,000. The heaviest grade on the whole line is from Edmonds east three miles, the grade being between 2 and 2½ per cent. After the first three miles the grade is about one half of one per cent.

Ellensburg & Northeastern.—The Ellensburg & Northeastern Construction Co. has been organized by J. R. Patton and L. W. Anderson, of Tacoma, Wash., to build the extension of this road from its present terminus on the Columbia River near Ellensburg to a point on the Northern Pacific in the Concomully mining country. The capital stock of the company is \$100,000.

Fairhaven & Southern.—A four-mile branch to the coal mines, starting about three miles south of Sedro, Wash., will be completed by the end of the month. Five miles of grading has been completed from Sedro south, and 30 miles more is under way.

Florida Midland & Georgia.—J. A. Crawford, of Valdosta, Ga., has the contract for completing this road between Valdosta and Madison, Fla., 20 miles. It is expected to have the line in operation to Madison during January or early in February. This division of the line was partly graded a number of years ago, and the work is in fairly good condition. The survey has been completed from Madison to Dead Man's Bay, Fla., on the Gulf of Mexico, a distance of 70 miles.

Georges Valley.—The projectors of this line have secured a promise from the directors of the Penobscot Shore Line to look over the route shortly, and if the examination is satisfactory they agree to build the road and operate it as a branch. It is to extend from Union north to Warren, Me., a distance of eight miles.

Grand Trunk.—This company is now considering tenders for grading, masonry, tracklaying and ballasting on the following portions of the line: Scarborough Junction to Port Union, Ont., 7½ miles, and Trenton West Summit to Port Hope Viaduct, 33 miles.

Great Northern.—Track has been laid on the Pacific extension from Havre, Mont., to a point 32 miles west, and the iron is being put down at the rate of two miles per day. Work will be pushed vigorously east of the mountains until winter sets in, when the 2,000 men now at work near Assiniboine will be put at work on the division west of the summit of the Rockies, where probably 6,000 men will be engaged. The Flathead Valley is to be the base of supplies and a new town, Pacific, is being built by some of those being interested in the company. The entire work of construction from Havre to the crossing of the Columbia River is under contract to Shepard, Siems & Co., of St. Paul. The eastern part to the summit of the Rockies is prairie work, with very easy grades. West of the summit for a short distance the line has not been surveyed, but many parties of engineers are engaged in surveying.

Harmon, Parsons & Rowelsburg.—Grading on this road will be commenced in Tucker County, W. Va., about Jan. 1.

Huntington Belt Line.—A charter has been issued to this West Virginia company. It proposes to build a belt line at Huntington, W. Va., and a union terminal station. The capital stock subscribed is \$200,000.

Kansas City, Louisiana & Gulf.—It is claimed that grading will soon be commenced at Arcadia, La., and that all the arrangements for building the first division of the line have been completed. The line from Arcadia south to a point on the Red River near Boyce, La., has been located. The distance is 87 miles. This section will require 20,000 cu. yds. of grading per mile. The maximum grade is one per cent. and the maximum curvature three degrees. The proposed route through the state of Louisiana is through the parishes Vermilion, La Fayette, St. Landry, Rapides, Grant, Winn, Natchitoches, Bienville and Claiborne. Most of the land of these parishes is cultivated farm lands, and a large section is valuable timber land. The principal office is at Arcadia. John D. Wirtz, of Atchison, Kan., is Chief Engineer.

Kennebec Central.—The company has petitioned the state railroad commissioners for a charter to extend its road from Togus, Me., to Windsor Village, a distance of 13 miles.

Lackawanna & Montrose.—The only work now in progress on the extension of this line is bridge building. The grading was suspended a few weeks ago, and will not be resumed until spring. About two-thirds of the work is finished. The extension is about 12 miles long and is being built from Montrose easterly to Alford, Pa., on the Delaware, Lackawanna & Western.

Lake Michigan & Lake Superior.—A company of this name filed its charter with the Secretary of State of Michigan, at Lansing, Nov. 15. The capital stock is \$500,000.

Lake Superior & Northwestern.—Surveys are now being made for this line from Duluth to the Messabi iron range in Northern Minnesota, and the necessary capital having been secured, construction will be commenced in the spring.

Little Falls and Southern.—This company has been incorporated in Minnesota for the purpose of building a railroad from Little Falls, Minn., to a point on the state line in Tp. 101, s. 35, Jackson County. The capital stock is \$200,000, and the incorporators are Peter Berkey, W. D. Cornish, John A. Berkey, W. B. S. Wright and Chas. S. Bunker, all of St. Paul.

Louisville & Southeastern.—A locating survey is to be made for this road from Louisville south from Mt. Washington, Ky., 20 miles, and probably also to Smithville, five miles further. The company was chartered by the state Legislature last March, and a preliminary survey was made about that time. Since then no work has been done. W. B. Hoke, of Louisville, is president.

Macon & Birmingham.—As soon as the track has been finished at Thomaston the road will be placed in operation between Macon and Woodbury, Ga., on the Georgia Midland & Gulf. The first 95 miles of the line from Macon through Culloden, Jobsville, Thomaston and Woodbury to La Grange, Ga., will be finished before the end of December; only about 17 miles of track remain to be laid to complete the line to that point.

Macon & Dublin.—It is reported that work is being pushed rapidly all along the line of the new road, and it is expected that it will be completed within a few months. Nearly the whole distance between Macon and Dublin, Ga., 52 miles, has been graded, 10 miles of track has been laid, and the rails for the whole distance are on the ground. It is the intention of the company to build from Dublin in the direction of Savannah as soon as the line from Macon to Dublin is completed. The line will be completed to some point near Savannah. The road is building parallel to the Macon & Atlantic, and some time ago enjoined that road from constructing its line through certain territory in close proximity to the Macon & Dublin. The injunction was not sustained, however. Work was begun on the line in July, and has been pushed rapidly.

Macon & Savannah.—The tracklaying will probably begin at Macon, Ga., about Jan. 1. J. S. McTigue & Co., of Macon, who have the contract, are sub-letting the work, and expect to commence to lay track at the time given. The grading is in progress on nearly 150 miles, and 60 miles of this distance is ready for tracklaying; the ties have been cut, and most of the trestling has been finished. The most important structures to be built are the draw bridges across the Ocmulgee, Oconee and Savannah rivers; these three structures will aggregate about 1,300 ft.; the grading is generally light, the heaviest grade being one per cent., the maximum curves of four degrees. The Atlantic terminus of the line will be at Colleton, S. C., a short distance south of Port Royal. The road will be 185 miles long, of which 164 miles will be in Georgia.

Middle & East Tennessee.—The completion of this road has been delayed for a considerable period by the delay in receiving rails. The grading was completed in October, and since then the most important work to be finished was a long trestle. The road extends from Roganna, near Gallatin, easterly to Hartsfield, Tenn., about 20 miles, and it is reported that an extension will soon be built from the latter point to Carthage. The road will probably be in operation early in January. It is being built by J. C. Rodemer & Co., of Gallatin.

Minneapolis, St. Paul & Sault Ste. Marie.—The company has decided to build a short line at Minneapolis.

lis, Minn., for the purpose of forming a connection between the main line and the Pacific division at Shingle Creek. The company has found it desirable to establish a short connection between the east and west side lines in order to facilitate its business. This connection will extend from a point near the shops to Shingle Creek, on the west side of the city, and will include another bridge across the river. The amount of land required for the improvement is not large, and will not form any considerable portion of the expense. According to estimates all the necessary land can be acquired and the bridge completed for from \$30,000 to \$100,000. It is the intention to commence work as soon as practicable.

Nashville & Mississippi Delta.—Capt. J. S. Foster, Chief Engineer, has just completed the survey of this road from Okalona to Grenada, Miss., a distance of 65.9 miles.

New Roads.—The Board of Trade and other public bodies of Gainesville, Tex., have undertaken the organization of two railroad companies to build roads from that city. About \$60,000 is reported as subscribed in the town for the road. One line is to extend from Gainesville northeast through Cooke County for 40 miles, crossing Red River near Dexter, thence to McAlister, I. T., to the rich coal fields of the Choctaw Nation. This road will be 120 miles in length. The other extends in a northwest direction, crossing Cooke and Montague counties, and entering the Indian Territory near Belcherville, 45 miles from Gainesville, thence through the Chickasaw country and connecting with the Rock Island railroad at a point on that line several miles south of Minco, I. T. This road will be 125 miles in length. Charters have been applied for.

It is proposed to organize a stock company to build a road from Glasgow, Va., via Natural Bridge, Lexington and Buena Vista back to Glasgow. The distance is 30 miles. The Rockbridge Co. will have an interest in the line, if built.

Norfolk & Carolina.—The Richmond & Danville has sold its half interest in this line to the Atlantic Coast Line which will therefore have complete control of the road. It was built by the two companies jointly between Norfolk Harbor and Tarboro, N. C., a distance of 100 miles. It parallels the Seaboard & Roanoke and was begun soon after that company undertook the construction of the line from Monroe to Atlanta, Ga., which parallels one of the Richmond & Danville lines. It was open for traffic last April.

Northern Pacific.—The contractors on the extension from Centralia, Wash., west to Gray's Harbor, Griggs & Heustis, are increasing their force as rapidly as possible. Right-of-way agents are at work between Black River and Elma, and the forces are being concentrated there in order to get the heavy work between those points completed. The road between Centralia and Mound Prairie has been ballasted and is ready to be turned over to the operating department, and between Mound Prairie and Black River it has been partially ballasted.

Seven miles of track has been laid on the Green River & Northern road from the junction with the Northern Pacific at Palmer, Wash., north toward the mines at Raging River, to which the branch is to be built. About 500 men employed on the branch by the contractors, King & Dickinson, have been transferred to the Tacoma, Olympia & Gray's Harbor branch.

Omaha, Kansas Central & Galveston.—The charter of the company was filed with the Secretary of State, at Topeka, Kan., last week. The capital stock is placed at \$18,000,000, and the estimated length of the proposed road is 500 miles. The charter was filed by C. M. Rawlings, of Lyons, Kan., who claims that all necessary funds have been pledged, and that as soon as all preliminary arrangements are perfected work will be commenced on the road at Superior, Neb. The directors of the new company are Valdemar Sjölo, Gustav W. Buck, Jacob Newberger and George H. Bailey, of New York, and D. M. Bell, Alonzo Jones and C. M. Rawlings, of Lyons, Kan.

Plymouth & Middleboro.—The preliminary survey for the new line of the road was completed last week, and the work of locating will begin at once. The new route is 15.6 miles long, this survey having shortened the length originally planned by about a mile.

Southern Pacific.—The contract for tracklaying on the Tracy branch from Los Banos to Ormona, Cal., a distance of 88 miles, has been awarded to Turton & Knox, of Sacramento, and the work of completing this line will be commenced early this week.

The contract for the grading and masonry work for the new line to be built from Comstock to Shumla, Tex., has been let to Ricker, Lee & Co., of Galveston, Tex. The distance where the line is now in operation, between Comstock and Shumla, is 25 miles, while the new line will be only 13 miles. The line now in use runs along the tanks of the Rio Grande and close to the track are high cliffs, with overhanging rocks. When the Southern Pacific was being built, it was considered impracticable to build the line along the route which has just been decided upon. The reason why the new line was not originally adopted was because it was thought almost impossible to bridge the Pecos river. This bridge when completed will be 1,900 ft. long and 330 feet above the water. The bridge will be a lattice girder, with one cantilever span over the stream, all carried on steel towers. There will be 16 spans 65 ft. long, 16 tower spans 35 ft. long, and a cantilever span 175 ft. long.

Tobique Valley.—The construction work has been resumed recently on this New Brunswick road after a suspension of several months. About two miles of track has been laid near Andover, N. B. George Kitchum & Son, of Fredericton, N. B., have the contract for the completion of the line to Plaster Rock, N. B., 14 miles from the present end of track.

Utah Central.—W. F. Tolly, of Nephi, Utah, has been awarded the contract for tracklaying on the section of this road from the station in Salt Lake City west to Monahansett, on Great Salt Lake, a distance of 10 miles. The tracklaying has been started on Fourth West street, in Salt Lake City, and it is expected to have a line in operation within a month.

Wabash.—A special meeting of stockholders was held at St. Louis, Nov. 25. The meeting was called to vote on the proposition to issue \$3,500,000 of bonds secured by a mortgage on the proposed new line from Montpelier, O., to Hammond, Ind., giving the Wabash a line of its own between Detroit and Chicago. All the stock represented, amounting to four-fifths of the entire issue of the road, was voted in favor of the proposition. If this connecting link is built it will make the Wabash independent of the Chicago & Erie road.

Waco, Lampasas & Llano.—The articles of incorporation were filed in Texas last week for the road to be built by C. G. Lougcope, of Philadelphia, and T. F. McClure, of Wellston, O., and which has previously been referred to as the Waco, Lampasas & Llano Iron. The road is chartered to build from Waco through the counties of Corvell, Lampasas, Burnet and Llano to the iron mines at Llano, and will be 150 miles in length. The Chief Engineer is C. A. Gilchrist, of Fort Madison, Ia., formerly Superintendent of the Fort Madison & North-western.

West Virginia Central & Pittsburgh.—It is stated that the company will build a road from Elkins to Philippi, thence via Grafton and Fairmont to Fair Chance, Pa., on the Pennsylvania, giving a direct line between Pittsburgh and points on this road. The company is also reported as proposing to continue its extension to Beverly southeasterly through Webster, Pocahontas, Greenbrier and Monroe Counties into Virginia, to connect with the Chesapeake & Ohio, at Goshen, Va.

The company is making a survey for a branch from Elkins southeast to Bealington, W. Va., a distance of about 17 miles.

Winnipeg & Northern Pacific.—The Dominion Government is advised that the survey of this road has been commenced. The company was incorporated by act of Parliament in 1886. It provides for the construction of a line, Winnipeg to the Pacific Coast, at Port Simpson, near the mouth of the Skeene River. The general course of the road is northwesterly, crossing the Saskatchewan River near the forks of the north and south branches of the river, thence by Lac la Biche and the lesser Slave Lake to Dunvegan, in the Peace River district. From Dunvegan the line runs westerly along Peace River Valley to the valley of the Finley River, thence in a westerly course to the Pacific Ocean.

GENERAL RAILROAD NEWS.

Danville & Western.—In the United States Circuit Court at Danville, Va., Judge Bond has confirmed the sale of the Danville & New River road to the Richmond & Danville. The name of the road has been changed to the Danville & Western. It is understood that it will soon be made standard gauge between Danville and Stuart, Va., 75 miles, and then extended to Wilkesboro, N. C.

Decatur, Chesapeake & New Orleans.—Judge Jackson, of the United States Court at Nashville, Tenn., has appointed W. L. Frierson, of Shelbyville, Receiver of the road, under a bill filed by the American Loan & Trust Co. of New York. The court had previously appointed a temporary receiver on an application made by Dr. G. C. Sandusky, who was formerly President of the road. In his application it was charged that the company was insolvent and had sold out to another company that owed large sums of money. When the case came up, attorneys for the railroad moved to dismiss the Sandusky bill for want of jurisdiction. The court overruled the motion to dismiss the bill and appointed W. L. Frierson Receiver. There are claims against the company for a very large amount, and the progress of the case is watched with interest. The road is practically built from Shelbyville, Tenn., to a point south of Fayetteville, Tenn., on Elk River. It is projected from Galatin, Tenn., to Decatur, Ala.

Rochester & Lake Ontario.—The New York State Board of Railroad Commissioners has denied the application of the railroad company for permission to suspend the operation of its road during the coming winter months. A similar application by this road was denied last year by the board. The road extends from Rochester to Irondequoit Bay, N. Y., 6 miles.

St. Louis, Merchants' Bridge & Terminal Co.—There has been filed with the Recorder of Deeds at St. Louis a deed of trust for \$3,500,000 from the company to the Farmers' Loan & Trust Co., of New York. This mortgage covers all the property of the former company, and was given to secure the payment on a loan for the amount of the mortgage, running 40 years at five per cent. per annum. The Farmers' Loan & Trust Co., of New York, is trustee. The old issue of bonds, amounting to \$2,000,000, will be taken up and replaced by the new issue.

St. Louis & San Francisco.—The directors have authorized the issue of \$40,000,000 new four per cent. bonds to consolidate underlying bonds and leave a surplus for any necessary expenses. It is said that some of the large holders of first preferred stock will petition the company for an exchange of the new bonds for stock. The reason is that while the first preferred stock is entitled to seven per cent., if earned, the lower rate of interest on the bonds will be a more certain source of income. An interchange would also give the stockholders a mortgage liability, which is not possessed now.

Union Pacific.—The company has announced that the following stations, Hancock, Alpine Tunnel, Woodstock and Quartz, Colo., on the Gunnison branch of the Denver, Leadville & Gunnison, between Romley & Pitkin, Colo., have been closed for the winter, as no attempt is made to keep the line from becoming blocked from snow.

TRAFFIC.

Chicago Traffic Matters.

CHICAGO, Nov. 26, 1890.

The Interstate Commerce Commission has extended the time of adjusting hog and hog product rates to Dec. 22. The Alton will not yet recede from its position to lower the hog rate. All other lines want to equalize the rates by raising the product rate.

The two arbitrators selected to determine the question of dressed beef differentials are Mr. George M. Bogue, selected by the Grand Trunk, the Canadian Pacific, the Wabash and the Boston & Maine, and Mr. Henry B. Stone, formerly Vice-President of the Burlington, selected by the non-differential lines. They will meet in Chicago this week and in New York Dec. 9. A third arbitrator will only be chosen if the two already named fail to agree.

The matter of the 91,000 miles of Atchison editorial tickets which the Chicago, Rock Island & Pacific found in the hands of a scalper is still unsettled. They were turned over to Chairman Finley, of the Western Passenger Association, but the Santa Fe people decline to redeem them, on the ground that the tickets were not on the market when purchased by the Rock Island, having been bulletined by the Santa Fe in a notice to conductors not to honor them. Chairman Finley has issued a decision in which he holds that all tickets found on the market disturbing rates must be redeemed whether they have been bulletined or not.

President John M. Egan, of the Chicago, St. Paul & Kansas City, says that his competitors have contracts with steamship and emigration agencies which render it practically impossible for his road to secure a proper share of through traffic. He says: "Several lines are selling tickets from Portland, Or., to Kansas City, at \$39.50. These tickets are sold from Portland to Sioux City, thence to St. Paul, and from St. Paul back through Sioux City to Kansas City. In addition to this the coupons of these tickets reading from St. Paul to Kansas City were in most of the cases exchanged by the lines over which they read for tickets exchanged to Chicago. This kind of working is being extensively carried on by lines which pose as models of railroad morality."

When the alleged rate cutting was before the grand jury last week Charles Counselman, the well-known Board of Trade man, was called as a witness. He refused to answer certain questions, on the ground that he might criminate himself. Accordingly he was cited to appear before Judge Blodgett this week, to show cause why he should not be punished for his refusal to answer. It was argued that the Constitution of the United States guaranteed a witness immunity from answering any question which might criminate him; that the Interstate law provided for the investigation of such cases by the Interstate Commission, and that the Grand Jury must have a definite accusation to work on. On the other side it was argued that the point of constitutionality was not well taken, for the reason that the statutes distinctly provided that any evidence a witness might give before the grand jury could not be used in a criminal proceeding against himself.

The competitors of the Chicago & Northwestern between Chicago and Omaha have finally acceded to the terms of the Union Pacific, and have announced through freight tariffs. It is said that even the Burlington has joined in the agreement. It appears that the agreement between the Union Pacific and the C. & N. W. was not so exclusive but that other roads could enjoy many of its privileges on the same terms as the latter road, but the U. P. has evidently made some concessions. It will now prorate with the Rock Island at all points where the two roads connect. On business to points west of Denver the Rock Island is allowed its full proportion to Denver. The C. & N. W. is understood to have made a traffic agreement with the Rock Island and Union Pacific whereby the former gets its business from the Missouri to Denver, and the latter from Omaha to San Francisco and Oregon.

The Board of Chairmen yesterday ordered the Atchison to turn over 150 cars of grain each to the Rock Island and Alton.

The opening of the new Grand Central Depot will occur December 8.

A statement has been published showing the amount of freight traffic passing the Missouri River for the months of September and October to have been as follows:

September.	East-bound. No. of cars. P. c.	West-bound. No. of cars. P. c.
Atchison and St. Louis & S. F.	6,935	1,747
C. & N. W. & O. P. E.	2,879	890
Burlington and S. C. & P.	810	2,050
Mo. Pacific	4,130	1,567
Rock Island	1,912	1,063
U. P. and St. J. & G. I.	5,356	4,899
K. C. F. S. & M.	1,604	86
	23,036	12,051
October:		
Atchison & St. L. & S. F.	8,004	1,828
C. & N. W. & O. P. E.	3,260	751
Burlington	817	1,423
Mo. Pacific	4,474	1,499
Rock Island	2,612	1,274
U. P. and St. J. & G. I.	6,358	5,812
K. C. F. S. & M.	2,001	114
	27,565	12,701

Traffic Notes.

The Canadian Pacific has issued a circular announcing demurrage regulations, in which the rate per day is \$2.

The Transcontinental Association has decided to advance all freight rates on Pacific coast business 10 per cent., beginning Dec. 1.

The roads centering in Jersey City have taken steps toward organizing a Car Service Association to cover the state of New Jersey. It will probably go into operation Jan. 1.

The Wabash and the Canadian Pacific have put on an additional line of sleeping cars between Chicago and Toronto, leaving Chicago at 9:05 p. m. and Toronto at 2:30 p. m. daily.

A cargo of bananas sent by a Plant line steamship from Kingston, Jamaica, to Port Tampa, Fla., and thence by the Plant lines and Louisville & Nashville to Chicago, recently made the trip in seven days.

The New York Central will put on, Dec. 1, a fast train between New York and Buffalo, to be known as "the Buffalo special." It will leave New York at 7:30 p. m. and leave Buffalo at 7:20 p. m. daily, running through in 12 hours each way.

The Philadelphia Car Service Association handled 59,365 cars in October, the average detention which, it is stated, includes all commodities, being 1.55 days; nearly 92 per cent. of the cars were released within 48 hours.

Eastbound shipments from Chicago last week were 73,810 tons; an increase of 7,752 over the previous week. The increase is principally attributable to the approaching advance in rates. The increases affected by the new tariff, which went into effect Nov. 24, are, on dressed beef 10 cents, corn 2½ (to 22½), oats 5 cents (to 25), other grain 2½ cents (to 25); provisions 7 cents, cattle 8 cents, and hogs 7 cents.

It is said that the Rate Committee of the Southern Railway and Steamship Association has adopted the proposed uniform classification, to take effect not later than June 1, 1891. It is also claimed that the organizations that have thus far given their approval of the new classification are the Central Traffic, the Western Freight, the New England, the Mississippi Valley and the Southwestern Railway and Steamship Association. The Interstate Commerce Commission has issued a report on the complaint of James McMillan & Co. against the Western Classification Committee concerning the classification of hides and pelts. The opinion, written by Commissioner Bragg, holds that a complaint against a classification committee has no standing. The carriers are not bound by the action of such a committee, and must themselves be made defendants. The roads of the country being engaged in an effort to unify the various classifications, the Commission will wait a reasonable time before disturbing their work.